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Breech-loading Repeating Rifle.

The advantages which breech-loading guns, more particularly repeating (or those which fire many charges in quick succession by means of mechanical contrivances), have over ordinary weapons has been too marked in the present war to be overlooked. For some inexplicable reason they are not in favor with army officials, and as a consequence but few regiments are armed with them.

There is every reason why they should be in the hands of at least one-half of our troops. The improvements which have been made in this class of small arms are very great, so that the objections which were justly made in earlier periods about their complexity and liability to derangement, are now futile.

The weapon here illustrated is a good one of its class, and should receive attention from the proper authorities. The mechanism is so simple as to require little attention to keep it in order, and if the workmanship expended is equal to the capacity of the weapon, it will be both reliable and formidable.

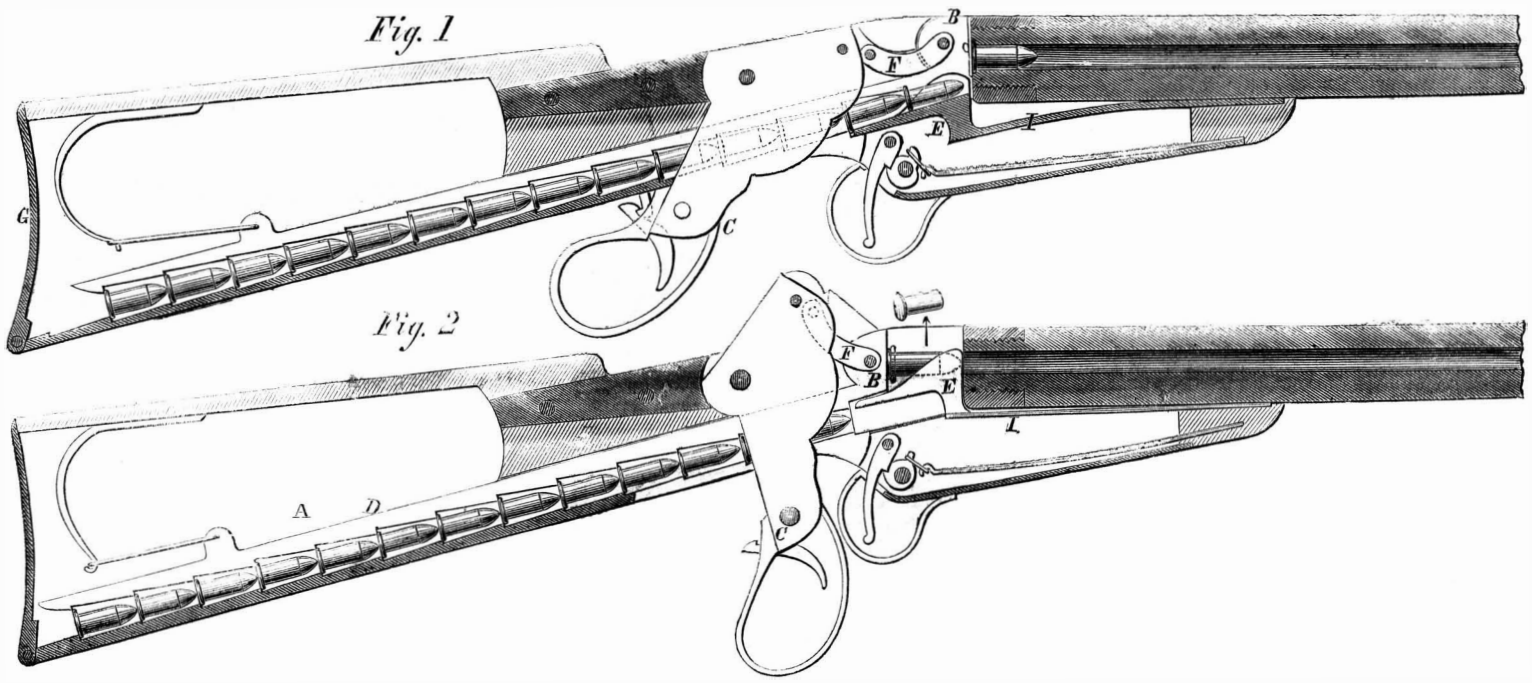
The musket consists of but few principal parts; these are the magazine, A, in the breech piece, B, worked by the guard, C; and the mechanism, D, which draws each cartridge up to its place in the chamber when it is fired.

Fig. 1 shows the weapon in section with a cartridge in place ready to be fired; while Fig. 2 shows the position of the parts during operations of loading. This is done by merely drawing back the breech-piece by means of the guard, C; when this is accomplished the empty shell of the cartridge just fired is thrown up by a spring inside, and the new cartridge elevated to its place by the lifter, E. The new cartridge is then in a position to be pushed into the exploding chamber, and this is done by simply replacing the guard as it is shown in Fig. 1.

The toggle links, F, which work the breech-piece from the guard, form a strong and gas-tight connection between the guard and chamber, and the length of the links can be so adjusted as to afford any amount of pressure required. The unexploded cartridges are drawn up by the ratchet rod, D; the depressions in this rod are so made that a cartridge rests in each one, and the charges themselves are to be inserted at the butt plate, G, which is hinged for that purpose. The cartridge-lifter, E, has a spring, I, which enables it to bring the cartridges up to the open end of the barrel. This is shown in Figs. 1 and 2. It will be seen that this weapon is both simple and strong, and if well constructed at the armory will prove an excellent arm. It is not unsightly or cumbrous, and the exterior presents no obstructions to interfere with a correct aim, or catch dirt and moisture, which tend to disable a gun; in this respect it is much superior to some of the revolving-chambered arms.

This weapon is the invention of John F. Appleby, a soldier in the 23d Regiment of Wisconsin Volunteers, and, an application for a patent is now pending.

For further information, address the inventor at Mazo-manie Post-office, Dane county, Wisconsin.



APPLEBY'S BREECH-LOADING REPEATING RIFLE.

Mummy Wheat.

The *Presse Scientifique des Deux Mondes* contains a description of a series of experiments made in Egypt by Figari-Bey on the wheat found in the ancient sepulchres of that country. A long dispute occurred a few years ago, as to what truth their might be in the popular belief, according to which this ancient wheat will not only germinate after the lapse of three thousand years, but produce ears of extraordinary size and beauty. The question is undecided; but Figari-Bey's paper, addressed to the Egyptian Institute at Alexandria, contains some facts which appear much in favor of a negative solution. One kind of wheat which Figari-Bey employed for his experiments had been found in Upper Egypt, at the bottom of a tomb at Medinet-Aboo, by M. Schnepp, secretary to the Egyptian Institute. There were two varieties of it, both pertaining to those still cultivated in Egypt. The form of the grains had not changed; but their color, both without and within, had become reddish, as if they had been exposed to smoke. The specific weight was also the same, viz: twenty-five grains to a gramme. On being ground they yield a good deal of flour, but are harder than common wheat, and not very friable; the color of the flour is somewhat lighter than that of the outer envelope. Its taste is bitter and bituminous; and when thrown into the fire, it emits a slight but pungent smell. On being sown in moist ground, under the usual pressure of the atmosphere, and at a temperature of 25° (Réaumer), the grains became soft, and swelled a little during the first four days; on the seventh day their tumefaction became more apparent, with an appearance of maceration and decomposition; and on the ninth day this decomposition was complete. No trace of germination could be discovered during all this time. Figari-Bey obtained similar negative results from grains of wheat found in other sepulchres, and also on barley proceeding from the same source; so that there is every reason to believe that the ears hitherto ostensibly obtained from mummy wheat proceed from grain accidentally contained in the mold into which the former was sown.

An Oil Lake in Trinadad.

The London *Times* says:—"There is in Trinidad, only a mile from the coast, a basin of ninety-nine acres, filled with asphalt, yielding seventy gallons of crude oil per tun. There are also springs of asphaltic oil in the neighborhood, and large pitch banks off the shore. It is estimated that the lake is capable of producing three hundred million gallons of oil, and forty or fifty gallons are considered equal to a tun of coal. The *Trinidad Colonist* publishes a *memoire* by Mr. Stollmeyer, of Port of Spain, proposing the use of this liquid fuel for oceanic steam navigation: and he states that he has been, at various times, for these three years, suggesting this employment of a distillate from the pitch lake of Trinidad. To oil a ship would not take above a tenth of the time it takes to coal her, if pipes were employed, and the oil would not take above a fourth of the space occupied by coals. He recommends that it be applied at once as auxiliary to coal, by throwing jets over the burning mass, but contemplates, eventually, upright tubular boilers, the liquid fuel to be supplied as fast as it can be converted into flame. Of course, the North American oil springs are another source of supply.

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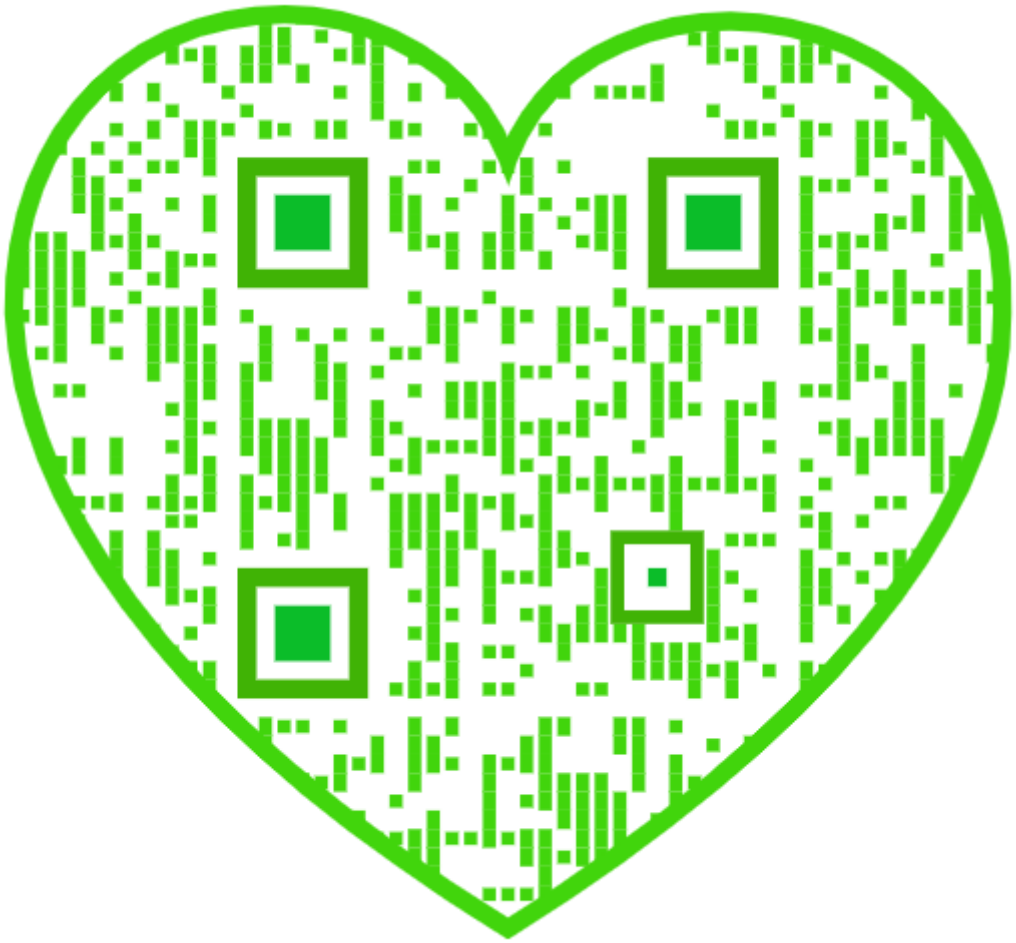

FAIRBAIRN ON STEAM BOILERS.

There is another question relating to the strength of boilers which requires careful attention, viz., the internal flues and their resistance to external uniform pressure. In calculating the strength of boilers the internal flues, until of late years, were never taken into account. They were always considered much stronger than the exterior shell, and that there was no danger from collapse. Yet, in the very face of these conclusions, numerous instances of fatal explosions occurred, not from the weakness of the boiler itself, but from collapse of the flues which, at a subsequent period, were found from actual experiment to be the weakest part of the construction.

From the first commencement of boiler construction to a very recent date we all of us acted under the impression that the flues were the strongest part of the boiler, and that a perfectly cylindrical tube, when subjected to a uniform pressure, converging upon its axis, was equal in its power of resistance, irrespective of its length. This was, however, an erroneous opinion, as I found, on submitting a series of cylindrical and elliptical tubes to external pressure, that they were weak, and in many cases, in long boilers, were only one-third or one-fourth the strength of the boiler. This anomalous condition of boiler construction will account for the numerous accidents that have occurred. It has now been remedied; and, by a very simple and inexpensive process, the flues may be strengthened to almost any degree of tenacity, by the simple introduction or attachment of T-iron hoops at certain distances in the length of the flues.

From these experiments, I found that the resistance of flues or tubes varies in the inverse ratio of their diameters; inversely as the lengths, and directly as a power of the thickness. Or it may be stated that the strengths decrease in the ratio of the increase of the diameters and the lengths, and increase nearly as the square of the thickness of the plates. The general formula for calculating the strength of wrought-iron tubes is, where

P = collapsing pressure in lbs.
K = thickness of plate in inches.
L = length of tube in feet.
D = diameter in inches, we have

$$P = 806{,}300 \frac{K^{2 \cdot 19}}{L\ D}$$

or it may be calculated by logarithms, in which case it may be written—

Log. P = 1·5265 + 2·19 log. 100 K — log. (L D).

To illustrate this remarkable law, if we take three flues perfectly similar in every respect, one 10, one 20, and the other 30 feet long, we shall find the first twice the strength of the second, and three times the strength of the third.

It will not be necessary to pursue this part of the subject further except only to direct attention to the following tables, which have been constructed from the experiments bearing directly upon the elastic force of steam, internally as relates to tension, and externally as relates to the collapse of the flues:—

TABLE SHOWING THE BURSTING AND SAFE WORKING PRESSURE OF BOILERS, AS DEDUCED FROM EXPERIMENT WITH A STRAIN OF 34,000 LBS. ON THE SQUARE INCH AS THE ULTIMATE STRENGTH OF RIVETED JOINTS.

Diameters of boilers.	Working pressure for ⅜-in. plates.	Bursting pressure for ⅜-in. plates.	Working pressure for ½-in. plates.	Bursting pressure for ½-in. plates.
ft. in.	lbs.	lbs.	lbs.	lbs.
3 0	118	708¼	157¼	944¼
3 3	109	653¾	145½	871¾
3 6	101	60[illegible]	134½	809½
3 9	94½	566½	125¾	755½
4 0	88½	531	118	708¼
4 3	83¼	500	111	666½
4 6	78¾	472	104¾	629½
4 9	74½	447¼	99¼	596¼
5 0	70¾	425	94¼	566½
5 3	67¼	401¾	89¾	539½
5 6	64¾	386¼	86¾	515
5 9	61½	369½	82	492¾
6 0	59	354	78¾	472
6 3	56¾	340	75½	453¼
6 6	54¼	326¼	72½	435¾
6 9	52¼	314½	69¾	419½
7 0	50½	303½	67¼	404¼
7 3	48¾	293	65	390¾
7 6	47	283¼	62¾	377½
7 9	45½	274	60¾	365½
8 0	44	265¾	59	354
8 3	42¾	257½	57	343¼
8 6	41½	250	55½	333¼

Rule for ⅜th inch plates:—Divide 4250 by the diameter of the boiler in inches; the quotient is the working pressure, being one-sixth the strength of the joints.

Rule for ½in. plates:—Divide 5666·6 by the diameter of the boiler in inches, and the quotient will be the greatest pressure that the boiler should work at when new; that is, at one-sixth the actual strength of the punched iron.

The above table may be considered perfectly safe for the construction of boilers of good iron, to be worked at the pressure indicated in the second column; and the following table of equal strengths of cylindrical flues may also be relied upon for a collapsing pressure of 450 lbs. per square inch:—

TABLE OF EQUAL STRENGTHS IN THE CYLINDRICAL FLUES OF BOILERS, FROM 1 FOOT TO 4 FEET IN DIAMETER, AND FROM 10 FEET TO 30 FEET IN LENGTH, SHOWING THE REQUISITE THICKNESS OF METAL FOR A COLLAPSING PRESSURE OF 450 LBS. PER SQ. INCH.

Diameter flue in inches.	Collapsing pressure of flue in lbs. per square inch.	Thickness of plates in parts of an inch. For a 10 ft. flue.	For a 20 ft. flue.	For a 30 ft. flue.
12	450	·291	·399	·480
18		·350	·480	·578
24		·399	·548	·659
30		·442	·607	·730
36		·480	·659	·794
42		·506	·707	·851
48		·548	·752	·905

[To be continued.]

THE CROPS—BI-MONTHLY REPORT OF THE AGRICULTURAL DEPARTMENT.

We have received from the Agricultural Department of the Government the "Bi-monthly Report for April and May," and find in it the first summary of the very extensive inquiries organized by the Department in relation to the condition of the crops throughout the country. A correspondence is opened with an intelligent resident of each county in every State, who reports the condition of the crops in his county as compared with the average of the ten previous years. If the crop is estimated at just the same as the average, he marks it 10; if it is one-tenth better he marks it 11; if it is one-tenth short he marks it 9. The clerks in the Department then calculate from the reports of the several counties the mean for the whole State, and these are published in the Bi-monthly Reports. They, of course, furnish a far more valuable estimate of the yield of various crops throughout the country than can be obtained from any other source. Had we room to spare we should publish the tables in full, but as it is we can give only the summary of the Commissioner.

FRUIT CROPS.

"The tables exhibit the general condition of the fruit and grain crops on the first of June. As was to have been expected from the character of the winter, this condition presents two general differences—in the East all crops promise abundantly, but in the West the fruits and fall-sown grain crops have been much injured by the intense severity of the cold at the close of the year 1863 and the cold of February, when there was but little snow on the ground, in nearly all localities. We will briefly notice each of the crops referred to in the tables.

"*Apples.*—In the Eastern and Middle States the crop will be a good one, but still there are localities where the wet weather caused the fruit to fall off. In the West a general complaint is made by our correspondents of this falling-off; and although the amount of the bloom indicates sufficient for an excellent crop, yet an injury which destroys a fourth of the fruit buds so as to prevent their blooming, is usually fatal to the setting of the rest.

"*Peaches.*—This crop is in good condition in the Eastern States; in the Western it is destroyed, with a large number of the trees, mostly the old ones. Canning peaches may therefore be looked upon as profitable to those having them during the next fall.

"*Pears.*—The pear has not yet reached a point in its cultivation when it may be regarded as a general market crop, but its hardiness has recommended it to every section of the country, and it is rapidly becoming more than a simple garden product. Like all other fruit crops, it is good in the East; in the West severely injured.

"*Grapes.*—The column asking which variety was most injured, and which the least, has been left blank, for the answers require a more careful arrangement than could be shown in the table. The returns connect themselves with many letters accompanying them; hence they will not be given until in our next report.

"*Maple Sugar and Molasses.*—It is gratifying to see the great increase in this manufacture. It will serve to keep down prices of the imported, as well as the amount of their importation. Should the crop of sorghum be favored with a good season, the country will supply its own wants and those of the smaller towns. The *quality* of the maple sugar is spoken of as good.

GRAIN CROPS.

"*Winter Wheat.*—The figures given in all the tables do not *directly* express the amount of the injuries. Thus 8 denotes an injury of *two-tenths*, and not *eight-tenths*, for the starting point in all estimates of an increase or decrease is at 10; thus 11 means an *increase* of *one-tenth*, and 9 a *decrease* of *one-tenth*.

"It will be seen that the winter wheat is in general good condition in the Eastern States, but in New York it is frozen out three-tenths, or thirty per cent., in Pennsylvania three and a half-tenths, in Maryland two and one-third tenths, in Kentucky and Ohio four-tenths, and in the rest of the Western States from three to three and a half tenths. This will lessen the wheat crop at least *thirty per cent.* from the yield of last year.

"The general growing condition is good; in some northern localities drought prevails, which reduces it below a general average in several of the States.

"*Drill and Broadcast Sowing.*—There is a marked difference in the loss by freezing between the drilled and broadcast sown. The cause of the injury varied in different localities; in many it was by upheaval, in others the roots were killed by exposure to intense cold without any protection, and in others by being covered with water, which froze so intensely as to destroy the roots of the wheat. The most marked difference in favor of drill-sowing was in the first of these causes. But these returns, too, so connect themselves with the information communicated by letter, that we reserve further comment until the next report.

"*Spring Wheat.*—This crop is looking unusually well, but it will be seen from the table that an average amount is not sown. The lateness of the spring and the great scarcity of labor prevented; but it is so nearly an average crop that, with no further drawback upon it, it will be excellent.

"*Barley.*—This is one of the most favorable crops, both in amount and its growing condition. It is above an average in both, and not a single complaint has been made about it.

"*Corn.*—The lateness of the spring retarded the planting of this crop, but the subsequent favorable weather brought it forward rapidly. In some northern localities it had to be replanted where put in early, but generally the crop never came up more favorably. The only State which returns a much lessened planting is Missouri, showing the effects of the war. In many places there are neither laborers nor fencing. In some States, as Winconsin and Minnesota, the crop is not in good growing condition. This is occasioned by drought; but generally our correspondents speak in most satisfactory terms of the prospect when their returns were made on the first of June.

"*Oats.*—A few words suffice for this crop. It was never as good as now, either in amount or growing condition.

"*Clover.*—This crop is highly favorable, both for pasture and hay.

"*Sheep.*—The condition and increase of these continue as heretofore reported, and the wool crop will be excellent. The next report will show the amount of wool clipped, and whatever else in our foreign imports and domestic consumption that will be of interest to the farmer.

"*Weather.*—The table exhibits a large proportion of 'wet weeks.' It was this state that so much favored the crops, especially of the fall-sown kinds.

"Since the foregoing was prepared for press, personal observation, and numerous reports from others, enable us to say that the hay crop of Pennsylvania, Delaware, Maryland, and probably all the Eastern States, has seldom, if ever, been excelled in quantity and quality, and is being secured in the best condition. The crops of wheat, oats and corn, in the same sections, are also as promising as ever seen at this season."

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Our observation in reference to the hay crop in Connecticut and western Massachussetts is, that, in consequence of the protracted dry weather in June, it will be light. The season opened favorably, but grass in the old fields was much stunted for want of late rains.

PHOTOGRAPHIC ITEMS.

NEW METHOD OF PRINTING.

The photographic world is at present greatly interested in a new method of printing pictures, lately made public by Mr Joseph W. Swan, of England. On the 5th of April, 1864, he appeared before the London Photographic Sooiety, and made a full statement of his new method, and presented a large number of beautiful specimens. The members of the society, among whom were many of the leading photographers of Great Britain, expressed their approbation of Mr. Swan's method, and pronounced the pictures in some respects superior to those which result from the present plan of nitrate of silver printing. There is a beauty in the gradation of the tones and a brilliancy of effect that cannot be imitated by the silver process. Specimens of the new pictures have been sent to this country. The editor of *Humphrey's Journal*, having examined some of them, says:—"The softness of tone, the accuracy of shading, and the peculiar color and glows, are strikingly pleasing at first sight, and do not become impaired by a more intimate inspection." The editor of the *Philadelphia Photographer* says of them:—"They are *wonderful* specimens of art, and are sure to make the old silver process so ashamed of its dark deeds that, like Judas, it will go commit suicide, and leave a name to be only despised when remembered." M. Gaudin, an eminent French photographer, speaking of Mr. Swan's pictures in *La Lumiere*, says that "it is impossible to imagine anything more perfect."

It appears to be the general opinion of the leading photographers of both hemispheres that the new process has something in it of great value. We hope that American photographers will not be backward in examining the subject, and putting it into practical use. The following is Mr. Swan's process:—

"The chemical principle is this, that gelatine, in combination with a salt of chromium, becomes insoluble in water after a short exposure to sunlight. This principle is capable of application to photography in many ways, one of the most obvious of which is to attach to paper a suitable tissue, and cover it with bichromated gelatine having a pigment mixed with it; expose this tissue to light, under a negative, and then wash away those portions of the coating not affected by the light. The exposed parts, having become insoluble, remain attached to the paper, and so produce a picture. The mixture of gelatine consists of one part of a solution of bichromate of ammonia (containing one part of the salt in three parts of water), two parts gelatine, one part sugar, and eight parts of water, with coloring matter added to produce the depth of tint required. The pigment used is Indian ink, either alone or mixed with indigo and carmine.

"The tissue is formed by coating a plate of glass or other smooth surface—first with collodion, and then with the colored gelatine mixture above described: the two films unite, and, when dry, may be separated in a sheet from the surface they were formed on. By this means a pliant tissue is obtained, which may be handled like paper, and may either be used in large sheets or cut up into pieces of any convenient size. The tissue, prepared in the manner described, corresponds with sensitive paper, and with proper appliances, the preparation of it need not be more troublesome than the double operation of albumenizing and exciting paper in the usual way. The tissue is much more sensitive to light than ordinary sensitive paper, and proportionately more care must be exercised to guard it from the action of light other than that which acts upon it while in the printing-frame. Like sensitive paper, too, it is better used soon after its preparation. The printing is done in the usual way, the tissue taking the place of sensitive paper, the collodionized surface being placed next the negative. The sensitiveness of the tissue may of course be varied by varying the proportion of the components of the gelatinous part of the tissue; but with the mixture given, the time of exposure required is only one-third or one-fourth of that which would be usually given with highly sensitive albumenized paper.

"The proper time for exposure can be determined pretty accurately, after a few trials; for, although there is not the same means of judging of the progress of the printing in the ordinary process, yet there is a far wider range between under and over exposure than in silver printing. It is no exaggeration to say that you may expose one piece of tissue twice as much as another, and yet obtain a good print from both; not perhaps quite so good as between the two extremes, but yet much more passable than would be the case with silver prints under and over exposed to the same extent. On taking the tissue from the printing-frame the image is faintly visible, and the next step in the process is to mount the tissue, with the collodionized face down, upon a piece of paper, or any other suitable material, to act as a support during development, and sometimes to form the basis of the picture, which may, if we please, remain permanently attached to this support, or may, if thought better, be afterwards transferred. There are several ways of mounting the tissue, and several adhesive substances may be used for the purpose, such as starch or a solution of india-rubber and dammar in benzole.

"After mounting, the tissue, with paper attached, is placed in water of about 100° Fah. The water presently begins to dissolve away the non-solarized portions of the gelatine, and in a few minutes the picture is fully disclosed. It is, however, advisable not to hurry the operation, but to give the water ample time to dissolve out the bichromate. It is also advisable to change the water three or four times. Leave the prints about two hours in the water. Where the picture has been over-exposed, longer immersion and hotter water will, in a great degree, rectify the mistake. Before finally removing the prints from the water, brush their surface lightly with a broad camel-hair brush; and, after taking them out, pour a stream of water over them to remove any loosely adherent particles of foreign matter that may by accident have got attached to the surface. The prints may then be hung up to dry, and are finished by being mounted on card-board and rolled, in the usual manner. Another way of proceeding is to remount the developed print, face downward, upon a second piece of paper or card-board—say with starch or gelatine—and, when this is dry, to remove the paper that was attached to the tissue previous to development; this can easily be done if the surface of the paper is moistened with benzole. In one way the image is reversed, and the collodion surface is downward; and in the other the image is not reversed, and the collodion film is uppermost. In practice, probably, the simpler mode will generally be preferred."

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week ; the claims may be found in the official list:—

Machine for heading Bolts.—This invention relates to a machine for heading bolts in which the bolts are held stationary by means of two jaws while their heads are exposed to the successive action of a series of heading dies striking the sides and the top of each head; these heading dies are adjustable to suit heads of different sizes, and they are operated by hinged spring dogs which are connected to a foot lever in such a manner that by stepping on the same the dogs are successively thrown in working position causing two of the heading dies to act first on two opposite sides of the head, and the second pair afterwards; and, finally, the vertical die is set in motion and caused to act on the top of the head; and by these means all sides of the head and its top are smoothed without moving the bolt in the jaws. The foot lever connects with a guide lever, the position of which is determined by a cam groove in the circumference of a revolving drum in such a manner that the foot lever is prevented from throwing the spring dogs in gear with the heading dies at the wrong point. Finally, the connection between the foot lever and hinged dog acting on the vertical heading die is made by means of a spring rod, and a yielding bolster is inserted between said dog and its connection with its crank shaft, in such a manner that the dogs of the horizontal dies will be thrown in gear before that of the vertical die; and in case said vertical heading die meets with an undue resistance it is allowed to yield, and injury to the working parts of the machine is prevented. James Minter, of Worcester, Mass., is the inventor of this improvement.

Preserving Meat.—This invention consists in exposing the meat to be preserved before it is put up in packages, to a heavy pressure in such a manner that nearly all the water not chemically combined with the meat and a large quantity of air contained between the various pieces and in the pores of the same is expelled before the meat is put up in the packages, and by these means the principal agents of putrefaction are removed and its bulk is considerably reduced. It consists, further, in a press-bar provided with a hinged end and movable screw top, in combination with a follower, and also with a frame fitting to the end of said press-box, capable of receiving and holding the mouth of the package to be filled with meat in such a manner that by removing the top of the press-box the meat can be easily introduced, and by closing down said top it can also be readily compressed to agree with the size of the package ; and after it has been compressed, by opening the movable end of the press-box and putting the package in its place, the compressed meat can be easily forced into the package without exposing the latter to any undue strain or pressure. W. C. Marshall, of New York city, is the inventor of this improvement.

Propeller—This invention consists in providing a vessel with an iron frame at its stern to form a support for the rear end of the propeller shaft, and also in constructing the rudder stem in such a manner that it may be connected with the propeller shaft back of the propeller wheel. The object of the invention is to obtain a propeller which, with its necessary connections, will be fully protected from shot and also from drift-wood and ice, afford superior facilities in guiding, backing and turning a vessel, convenience in repairing, and which may be operated with but little labor. O. C. Phelps, of New York city, is the inventor of this improvement.

The claims of the following notices appeared in the list issued July 5, 1864:—

Cultivator.—This invention relates to that class of cultivators which are intended to straddle a row of corn or other plants, and which are so constructed that the plows can be readily depressed in or raised from the ground by the action of a hand-lever from the drivers seat, and also adjusted to cut in the ground to any desired depth. The plows are adjusted to beams which can be raised and lowered, and they are made reversible so that the dirt can be thrown in either direction. The frame is made in two sections, which can be adjusted further apart or closer together according to the width of the furrows or distance of the hills. A. G. Tucker, of Richview, Ill., is the inventor of this improvement.

Treating Gum for the Manufacture of Varnish.—The object of this invention is to facilitate the fusion and ebullition of such gums as are generally used in the manufacture of varnishes and for other purposes. The gums used in the manufacture of varnishes, etc., are generally exposed to the heat of a coal fire in copper kettles or boilers varying in size; the fire is placed in close proximity to the bottom of the kettle, and the melting of the gums is mostly limited to the bottom of the kettle or boiler. By the ebullition of the gum at the bottom a large quantity of the same, either fused or not, is forced up against the sides of the kettle or boiler, where it rapidly parts with a portion of its caloric and becomes resolidified. In this state it can be remelted with great difficulty, and a poor and dark varnish is the result. This disadvantage is avoided by the application of a jacket of a good non-conductor for heat to the body and cover of the kettle and also by the use of an exhauster so that the melting takes place at a pressure lower than that of the ordinary atmosphere. John Johnson, of Saco, Maine, is the inventor of this improvement.

COMMUNICATION WITH WASHINGTON.—Persons wishing to take out patents may relieve themselves from all anxiety respecting the transit of their models to Washington by sending them, with all their patent business, to Munn & Co., 37 Park Row. Pamphlet of information free.

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Improved Ship's Compass.

The distinctive peculiarities of this compass are, first, an air-tight metallic case or air vessel, within which is placed the magnetic needle. This air vessel is made of such size and weight that it may, with the inclosed needles and with its graduated circle or card, be of very nearly the same specific gravity as the liquid. By the buoyancy of the liquid, the weight upon the pivot is reduced to a few grains, and friction is almost wholly prevented. The inclosed steel magnet is also perfectly secured from oxidation. Second, in the form of the needle float or buoyant air vessel, being that of cross cylinders with a vertical card. One of these cylinders contains the needles while the lateral arms assist in supporting the weight and equalizing the resistance of the liquid to any tilting motion, and also support the vertical card ring. Third, in an elastic chamber communicating with the interior of the bowl to compensate for the unequal expansion of the liquid and the bowl. As the liquid expands much more than the metal by increase of temperature, a portion flows into this chamber; when the temperature is lowered the liquid contracts, causing the return of a portion from the expansion chamber; by this means the bowl is always entirely filled without bubbles, and all pressure is avoided.

Further information in relation to this invention may be obtained by addressing the patentees, E. S. Ritchie & Co., 313 Washington street, Boston.

A Singular Railway Catastrophe.

On a Western railroad a singular catastrophe occurred lately which is thus described in the Missouri *Republican* :—

"The road passes over the Cumberland mountains. On the eastern slope the train is pushed up, but on the western slope the train slides down, its motion being arrested by a close application of the brakes, and, if necessary, a reversal of the engine. About midnight of the day in question, the correspondent was asleep, but was startled suddenly into wakefulness by an unusual and extraordinary noise. On looking through the glass door at the end of the car, its origin was manifest; he beheld a sight which no mortal man, having once looked upon, could ever forget. Two trains had started at the same time as the one in which he rode. It was about half-way down the mountain (the grade being very steep), about two miles from the foot of the grade. The two trains in the rear were at the usual distance, 'when suddenly,' exclaims the correspondent, 'as if the brakes were out of order and would not work, the train behind us started forward with the rapidity of lightning and came tearing furiously toward us. Our engineer put on all steam in the endeavor to escape; the engineer of the crazy train reversed his engine, but it was all in vain! The train was under too much headway! It was when it had reached to less than a hundred yards of us that I awoke and looked out. Like a destroying demon, bent upon our annihilation, seemed the terrible engine. Its wheels were running in a reverse direction, but under the fearful force it had previously acquired, it would no longer obey the motion of the wheels. It was sliding onward to destroy us! and at times the wheels, fixed upon the track and balanced between the two forces, one urging the locomotive forward, the other endeavoring to pull it back, tore from the rails a stream of fire. Then the reversing force would whirl them round for a moment with the most awful rapidity.' The trains came in contact, were thrown down an embankment and smashed to pieces, but no one was killed outright, although many were badly wounded."

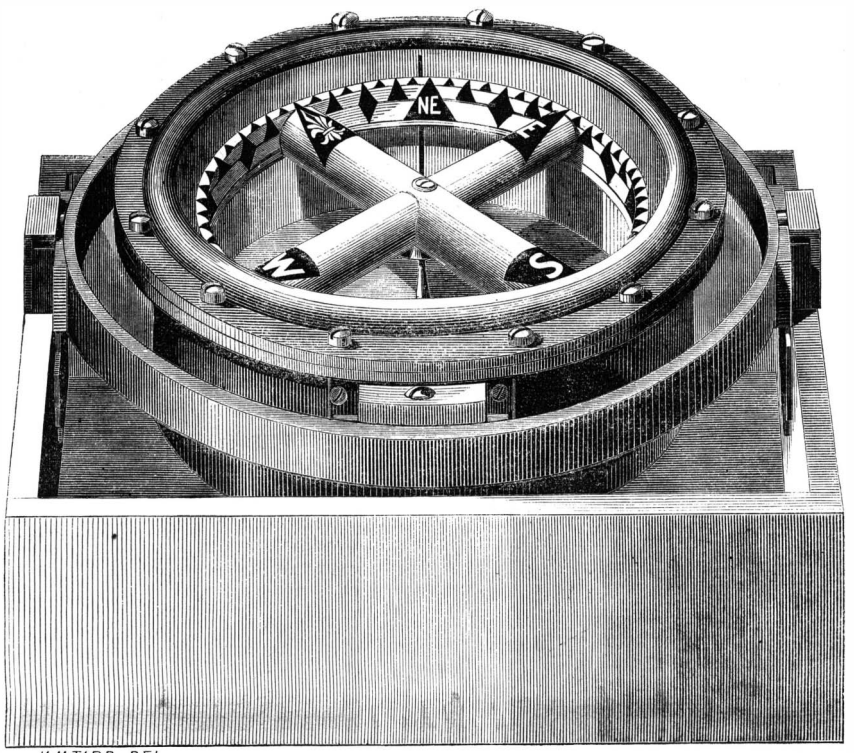
In Philadelphia there are 357 miles of water-pipe and 592 miles of gas-pipe.

Trial of New Guns at Shoeburyness.

A very important series of gunnery experiments took place at Shoeburyness on Friday, June 17. The object was to test the resisting powers of a target representing a section of the iron-clad *Lord Warden* now building, and in the same trials to determine the comparative penetrating powers of the Somerset and Frederick guns, and of the Armstrong and Anderson guns.

As regards the guns, the points to be determined were, first, whether the 6½-tun Somerset gun of 9·22 inch bore, or the 6½-tun Frederick gun of 7-inch bore, possessed the greater destructive power; and, second, whether the 12 1-8th-tun gun-factory gun of 9·22 inch bore or the 11¾-tun Armstrong gun of 10½-inch bore, possessed the greater destructive power. Then the results of the two pairs of guns would show whether the 6½-tun guns or the 12-odd tun guns did their work better. The Somerset is a handsome gun, on the Armstrong tube-and-coil construction, with Armstrong shunt rifling. The Frederick gun embodies Admiral Frederick's small-bore gun theory. The gallant admiral has long supposed that by the use of a small bore, as compared with a large bore, in guns of the same construction, more penetrative power would be obtained, because the greater mass of metal in the small-bore gun would admit of heavier charges than in the large-bore gun. The gun is constructed on the tube-and-coil principle of the Armstrong, with shunt rifling. Unlike the Somerset, the Frederick is an unsightly gun. Such are the first pair of guns—Armstrong shunt-muzzle loaders, of the same weight, but of different calibers. Then the heavy factory gun, or the Anderson as it has been called, is identical in pattern with the well-known Armstrong 300-pr. From the Armstrong it differs only in the bore and in the substitution of a steel barrel for a wrought-iron barrel; the barrel on which the first and other layers of coil are laid. Recent improvements or extensions in the manufacture of steel have enabled Mr. Anderson to make this change, as Sir William Armstrong has done of late, and Mr. Whitworth, following Sir William, has also done in his built-up 70-prs. The second pair of guns, therefore, like the first, are Armstrong shunt-muzzle guns, nearly of the same weight, but differing as before in caliber.

The weight of the section of the *Lord Warden* fired at on Friday is stated at 400 lbs. per square foot. The official description is that of a target 20 feet by 9 feet, representing the ordinary construction of a wood armor-clad ship, with the addition of an iron skin worked outside the frame of the ship. The scantlings are: frame timber molded, 12½ inches; iron diagonal sides, connecting the frame timbers, 6 inches by 1¼ inches; inner planking, 8 inches thick; iron skin, 1½ inches thick; outside planking 10 inches thick; rolled armor-plates, 4½ inches thick. These scantlings were through-bolted, with bolts of 2½ inches in diameter. Then in the rear of the target there were the deck beams—lower, 15 inches by 12 inches; upper, 16 inches by 16 inches; waterway, lower, 15 inches by 15 inches; upper 13 inches by 14 inches; deck planking, lower 4 inches; upper 4 inches. In a word, the target was a perfect section of the ship now building with lower deck and upper deck, lower beams and upper beams, etc. The iron work of the target, it may be well to add, is the produce of the Millwall Ironworks, and reflects the utmost credit on the company and Mr. Hughes. Battered to ruin as the target was, the armor plates were uncracked, and the bolts proved as unexceptionable as the plates.



M.M.TIDD DEL.

RITCHIE'S LIQUID SHIP'S COMPASS.

The first round fired was from the service 68-pounder, steel shot, 16 pounds charge. The shot produced an indent of 3·6 inches, striking the head of an armour bolt, and starting a bolt in the rear. No one on board the ship would have been injured; therefore the *Lord Warden* may be said to be proof against the 68-pounder fired, not with cast-iron shot, but with steel shot. The velocity of the shot was 1,500 feet per second.

In the second round the gun used was the Somerset gun, steel round shot, weighing 100 pounds; charge, 25 pounds. The shot struck at the waterways, where the target presented an aggragate thickness of 42½ inches, passed through the outer armor plate, and embedded itself in the backing. The waterway, 15 inches by 15 inches beam, was cracked through, but there were no splinters. This was a shot in the strongest part of the ship, and showed that a ship of even 42½ inches thick would in time be smashed by the 6½ tun 9·22 inches Somerset. The velocity of the shot was 1,540 feet per second.

The next round was fired from the same gun, steel shell, weighing empty 171 pounds; charge 20 pounds, and bursting charge 7 pounds. The outer plate was passed, the wood-work cracked right through, and the armor-plates started. The shell effect was trifling.

In the succeeding practice the Somerset beat the Frederick gun. The Somerset made the larger hole, the bore of the 9·22 inches against the 7 inches, with the same charge of powder, and exhibited greater penetrative power. In other words, the large bore beat the small bore with the same charge and the same weight of gun. The velocity of shot was 1,560 feet per second.

The Anderson gun, 12½ tuns, sent a 220 pounds steel shot with 44 pounds of powder clean through the target, but at its weakest part, namely, on the top of the shelf below the upper deck beam where thickness is only 27½ inches instead of 37½ inches as elsewhere.

A cast-iron shot from the Somerset gun also passed through the outer plate, the velocity being 1,260 feet per second.

The ninth round was fired from the Armstrong, 11½-tuns, 10·5 inch gun, 301 pounds steel shot; charge, 45 pounds. This was a most destructive shot, passing right through the whole structure, filling the deck with heavy splinters, and throwing an iron knee of 3 cwt. 2 qrs. 21 pounds a distance of 20 yards. The shot, after passing through the target, struck an immense granite block and broke into four pieces, one of the pieces bounding off a further distance of 50 yards. Three rounds more from the Anderson and Somerset guns terminated the experiments by completing the destruction of the target.

Twenty-three citizens of the town of Washington, N. H., made the past season 63,136 lbs. of maple sugar, worth about $10,000. The largest amount made by one individual was 4.533 lbs.

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Trap-making.

The Circular is a weekly paper published by the Oneida and Wallingford Communities—at Wallingford, Conn. Terms, "Free to all. Those who choose to pay may send one dollar a year." The last number of this paper contains an account of the trap manufactory of S. Newhouse, at the Oneida Community, from which we extract the most interesting portions:—

"Mr. Newhouse is a native of Brattleboro', Vt. His paternal grandfather was an English soldier who, having been taken prisoner by the Americans at the battle of Bunker Hill, afterwards adopted this country as his home. From Brattleboro' the parents of Mr. Newhouse removed during his infancy to Colerain, Mass., and in 1820, when he was fourteen years old, the family emigrated to Oneida County, N. Y. The need of a trapper in a new country is not pianofortes or *cartes de visite*, but *traps*. At seventeen Mr. Newhouse felt this need, and in the absence of other means of obtaining a supply, he set to work to make them. The iron parts of fifty or more were somewhat rudely fashioned in a blacksmith's shop, and for the steel springs the worn-out blades of old axes were made to serve as material. A mechanic of chance acquaintance showed the young artisan how to temper the springs. The traps thus extemporized proved on the whole a success; for they would catch, and what they caught they held. After the season's use they were sold to neighboring Indians for sixty-two cents apiece, and the making of a new supply was entered upon. These in turn were sold and replaced, and thus the manufacture of 'Newhouse Traps' was launched.

"During the next twenty years Mr. Newhouse worked at trap-making, sometimes alone and sometimes with a partner or with hired help. The extent of his manufacture was from one to two thousand traps per year, which supplied the local demand, and procured for him a reputation for skill in whatever pertained to wood-craft.

"The Community established itself at Oneida, about two miles from the residence of Mr. Newhouse, in 1848, and the next summer received him and his family as members. For several years after this but little attention was paid to the trap business. A few dozens were made occasionally by Mr. Newhouse in the old way, but it was not until 1855, under a call for traps from Chicago and New York, that practical interest was first directed to this branch of manufacture, with a view to its extension, by Mr. J. H. Noyes. Arrangements were then made for carrying on the business in a shop fifteen feet by twenty-five. The tools consisted of a common forge and bellows, hand-punch, swaging-mold, anvil, hammer, and file. The shop so established employed about three hands. The next year it was removed to a larger room in a building connected with water-power, and the number of hands was increased. Among them were several young men, who, together with Messrs. Noyes and Newhouse, exercised their inventive powers in devising mechanical appliances to take the place of hand-labor in fashioning the different parts of the trap. A power-punch was the first machine introduced, then a rolling apparatus for swaging the jaws. Soon it was found that malleable cast-iron could be used as a substitute for wrought-iron, in several parts of the trap. The brunt of labor expended had always been in the fabrication of the steel spring, and this was still executed with hammer and anvil wholly by hand. Two stalwart men, with a two-hand sledge and a heavy hammer reduced the steel to its elementary shape by about 120 blows, and it was afterward finished by a long series of lighter manipulations. The attempt was made to bring this part of the work within the grasp of machinery. One by one the difficulties in the way were overcome by the ingenuity of our machinists, until at length the whole process of forming the spring, from its condition as a steel bar to that of the bent, bowed, tempered and elastic article, ready for use, is now executed by machinery almost without the blow of a hammer. The addition of chain-making (also executed mostly by machine power) makes the manufacture of traps and their attachments complete.

"The statistics of the business thus extended are in part as follows:—Six sizes of traps are made, for the different grades of animals, from the muskrat to the bear, which have, to a great extent, superseded the use and importation of foreign traps in this country and Canada. The number of these made at the Community works during the last seven years is over half a million. The number of hands employed directly is about sixty, besides the twenty-five or thirty who find employment elsewhere in supplying the iron castings for traps. The number of hired hands in the Community shop is forty, whose present pay-roll amounts to over $1,100 per month, The amount of American iron and steel used is over 300,000 pounds annually.

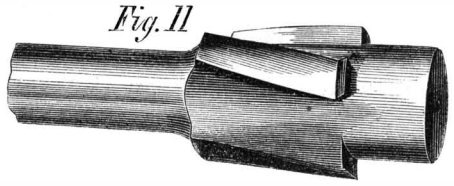
"We may add that to complete their arrangements for carrying on this business to the fullest extent of the possible demand for traps, the Community are building, the present season, a new manufacturing establishment on a water-power about a mile from their present works, which will enable them to more than duplicate their production."

BORING TOOLS.

NUMBER 3.

On page 37 of the current volume we discussed the merits of several sorts of boring tools, all of which are in daily use in machine-shops, in one or another part of the country. We take up the subject where we left it and submit to our readers some other plans of boring tools which have been found very effective. In Fig. 11 we have interposed an engraving of a

Fig. 11



counterborer, which was inadvertently omitted from our article on the "drill and its office," which received so much favor from machinists. It is merely a steel bar having cutters forged upon it in the manner shown. There are an unequal number of these cutters, five being preferred by the maker (Mr. White, a machinist of this city), and after the tool is forged it is turned in the lathe and filed up so as to cut. This is a neat-looking tool and one that we are assured does good work in the hands of skillful men. It may be made of any desired size or length; the one shown in the engraving is designed for gun-work.

The tools shown in the engravings published previously are merely those which are employed in comparatively light work, and in the minor operations of general machine work. There are cases, however, where these tools are not available, and others, entirely different and distinct in character, must be produced. An instance of this may be found in the cranks of heavy marine engines. These are forged solid, and the holes for the shaft and crank-pin are cut out of the mass of metal. In old times these cranks were bored by making a large hole with a common drill (say five inches in diameter), and afterward inserting a boring bar and cutter like the one shown in Fig. 12, and enlarging the hole. This method is doubtless still practiced in many shops, but there is another way which is more expeditious and economical. This is to bore a solid core out of the boss of the crank, as shown in Fig. 13, and leave the center standing.

Fig. 12

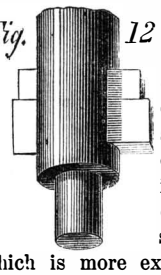
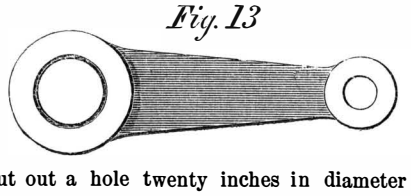
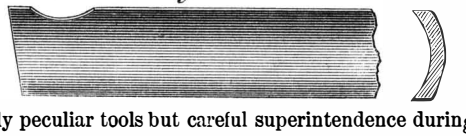


Fig. 13



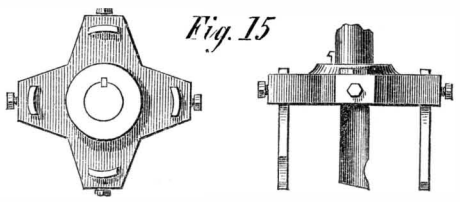
To cut out a hole twenty inches in diameter in solid metal is quite an achievement, and requires not only peculiar tools but careful superintendence during the operation. The tool is shown in Fig. 14. It is

Fig. 14



curved in section, perfectly flat and made very wide sideways, but not on its cutting edge. The cutting part is about $\frac{5}{8}$ths of an inch across. Four of these tools are set in a cast-iron cross which screws on the spindle of a heavy boring mill, and the tool thus arranged is shown complete in Fig. 15.

Fig. 15



The cutters are set so that two travel in line with each other, while the other two cut in another track, so that in this way a wide groove is produced from which the chips can be removed with facility. The channels are shown in Fig. 16. The tools do not bind or clog when care is taken, and they are so wide that they do not spring sideways. When one side has been cut half way down, the crank is turned over and bored from the other until the two cuts meet. The central core then falls out. The hole is afterwards bored true to the size required by an ordinary turning tool, and generally needs only two light cuts to finish it. With good luck one man should bore a twenty-inch hole, twenty inches deep in fifteen or twenty hours. The economy of this plan, as compared to the old one, is striking, and should be practiced in all shops that do work of this class.

Fig. 16

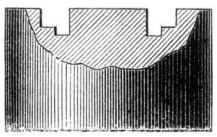
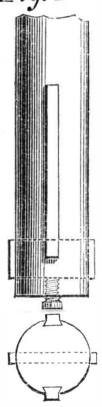


Fig. 17



A plan for a boring bar and cutter which was (and it may be still is) used in a mill for boring car wheels, is shown in Fig. 17. These wheels are used in such numbers on long lines of road, that it is necessary to provide some means for boring them as fast and as economically as possible. With this cutter a car wheel $3\frac{3}{4}$ bore and 8 inches deep, cored out $3\frac{3}{8}$, has been bored in from six to eight minutes complete. The arrangement is merely an ordinary bar with a cross-bit, or cutter through it; but at right angles with this there are two steel rimmer-blades, dovetailed in the bar. These rimmers are turned up in the bar itself, and can be driven out for grinding or other adjustment as required. They taper very slightly from the bottom to top, and are made a little larger than the cutter so as to follow it and true up the rough portions or surfaces left in the rapid descent. This cutter and bar does good work, when it is not forced too much, and we have known thirty wheels to be bored on the machine it was attached to in ten hours.

The "Scientific American."

The American mechanic will nowhere find in the same complete yet condensed form, the same amount of valuable and entertaining information that can be obtained in this journal, at the low subscription price of three dollars per annum. The volume commencing with the next issue will be especially rich in valuable information, as arrangements have been made to secure full tabular reports of the double set of experiments now progressing in New York, to test the actual value of working steam expansively. One series of experiments will be conducted by a commission under direction of the War Department, and will employ the basis of a fixed quantity of steam, with cylinders of different capacity. The other is progressing under direction of Messrs. Hecker & Waterman, and will be directed to ascertaining the value of steam worked expansively and non-expansively, in cylinders with and without a jacket of steam. To those who have already been subscribers to this journal we need say nothing. To those who have not heretofore had this privilege, we can recommend it as a serial that should be in the hands of every American mechanic —*Pittsburgh Dispatch.*

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Correspondence

Philosophy of the Barker Mill.

MESSRS. EDITORS:—On page 20, Volume XI. of your excellent journal is a description of a small Barker-mill engine. Though the construction of this mill is well known, the true principle of its action, I think, is understood by comparatively few. It is generally supposed that the reaction of the surrounding atmosphere or water on the issuing jets produces the motion, but a few experiments with the air-pump will explode this theory. Let the mill be placed under the receiver and the air be exhausted. There will then be no medium for action; but if the air is admitted through the mill, it will start with as great force and speed as if under 15 lbs. of steam.

The true principle I think is this:—As a motive power we have a fluid pressing externally with equal force in all directions. By making a small orifice in one side of the arm, we remove so much of the pressure in that direction, while the pressure still acts with full force in the opposite direction and produces motion.

A recent English work on "Mechanical Engineering" speaks of the hydraulic propeller which evidently acts on this principle, and yet the author attributes the motion produced to the reaction of the air or water on the jets issuing from the propeller. This propeller would doubtless work as successfully in a vacuum as the Barker-mill.

H. FORD.

Utica, N. Y., July 8th, 1864.

The Way Saws are Straightened.

MESSRS. EDITORS:—Permit me to correct your reply to "P. D. G., of N. Y.," on page 13, current volume of the SCIENTIFIC AMERICAN. The writer, as well as the other members of our firm, is a practical saw-maker. Circular saws, 6 by 12 inches face, slightly convex, are straightened on an anvil by hammers weighing from 8 to 10 lbs. One hammer is used for this purpose which is called the "cross-faced hammer." It strikes a blow one inch long and three-sixteenths of an inch wide. With it we work on the high places and twists of the plate. The other we term the "round-faced hammer," which makes a blow in shape and size of a five-cent silver coin (if you can recollect that!), to stretch the steel in whatever way needed to stiffen [straighten?] the saw after being buckled. There is such a machine as you describe, used by Waterman, of Brooklyn (E. D.), N. Y., to *chill* saw-plates, after which he straightens them as above. WOODROUGH, MCPARLIN & DUNN.

Cincinnati, Ohio, July 9, 1864.

Stage Scenery.

In the new drama of "AMASIS, or, the Last of the Pharaohs," of which our readers perhaps have seen notices in the various journals, a decided improvement has been adopted, much simplifying the usual manner of moving or shifting stage scenery. The old cumbersome "flat," with frame, is entirely done away with, the canvas being stretched in one entire sheet over the stage at the entrance, where the scene is used and disposed of on cylinders. This obviates the necessity of having an ugly crack running up and down the center of a scene, as is now the case in nearly all our theaters where flats or frames are used, and which always mar a scene, no matter how beautifully executed. Another advantage this mode has, is in economizing space behind the scenes, which is a very great desideratum, especially in small theaters and contracted stages; the scenery can be stored away in one-sixth the space occupied in the old way. The saving, in dispensing with the expense of frames, is also very important, especially to managers whose houses and treasuries are not very full. The invention is from the prolific brain of the celebrated Banvard, who has painted the scenery of "Amasis" in a most magnificent manner from sketches he made for the purpose while in Egypt, where the scene of the drama lies. We believe, also, it is the first attempt, either in this country or Europe, to present correct scenery of the very localities represented in a drama. We hope soon to have the pleasure of witnessing the drama of "Amasis," with its new mode of working scenery, at some of our Broadway theaters.

Action of Secretary Welles on the "Chenango" Disaster.

The jury empanelled on this case say:—"The men met their death from scalds and inhalation of steam on board the United States gun-boat, *Chenango*, by the bursting of one of the boilers, which was caused by a greater tension exerted on the boiler than it could bear, the result of imperfect bracing.

"The stays of the boiler being 64 in number, and attached to the tube boxes by 32 lugs, whereas the drawing calls for 64 braces attached to the 64 lugs; thereby reducing the strength of the bracing to about one-half of that shown in the drawing; also doubling the chances of rupture if a stay by carelessness should be left out; and the jurors consider the inspector of such boiler highly censurable, as they conceive it was his duty to have reported to his immediate superior when so vital a change as this had taken place in the construction of this boiler."

In consequence of the verdict in this case, Second Assistant Engineer S. Wilkins Cragg, the officer who inspected the boilers of the *Chenango*, is dismissed from the service, and will, from this date, cease to be considered as an officer of the navy.

Whatever differences of opinion may have existed among the members of the jury as to the particular causes of the explosion of the boiler of the *Chenango*, they were unanimous in their decision that the boiler was not constructed in conformity with the drawings and specifications, and that there was great fault in the staying.

There is, therefore, no excuse for the inspecting officer in this case, nor can there be in any, where defective work, or work not in conformity with the drawings and specifications, is not reported to the proper officer, or to this Department.

The disastrous effects of such negligence of duty, as shown in the case of the *Chenango*—the possible consequences in a national point of view, of permitting defective or unreliable vessels to be introduced, by fraud or negligence, in the naval service—will render it incumbent upon the Department hereafter to visit with the utmost rigor of the law any neglect of duty or faithlessness on the part of either inspecting officers or builders.

GIDEON WELLES, Secretary of the Navy.

[The verdict is in exact accordance with the views expressed in the SCIENTIFIC AMERICAN long before the deliberations of the jury were ended.—EDS.

INGHAM UNIVERSITY.

This institution, in its present prosperous and affluent condition—in its extensive buildings, grounds, library and apparatus—is a beautiful illustration of what woman, in her appropriate sphere, can do. Two sisters, whose name it bears, thirty years ago, without means, without influence, yet with an earnest resolve to do something for the benefit of their sex, and raise higher the standard of female education, planted the germ of this institution at Le Roy, N. Y. They watched, they watered it, and every successive year they have witnessed its growth and expansion, until now it is "an institution" indeed, a veritable university, with a university charter and powers as much so as Oxford or Cambridge; and those who complete its regular curriculum of study receive their degree and diploma as proof of their fidelity and scholarship.

It was our good fortune to attend its recent anniversary and commencement, and it is not our partiality for the fair sex that leads us to say that we were never better pleased, and never have we known examinations, in all the higher branches of science and mathematics better sustained. The mysteries of the calculus of conic sections, to these young aspirants for university honors, seemed as familiar as household words, while you would have supposed that Virgil and Homer and Heroditus were among their favorite authors. The fact is, we were surprised, and our old notion that woman could only skim the surface, and must be content with the ornamental, the esthetic, the mere poetry of an education, was fully displaced by the sober conviction that woman has equal powers of acquisition with us of the sterner sex, and may often bear away the laurel of successful competition. The compositions of the graduating class were of a high order, in point of strength, finish, and originality, and were read with a tone and emphasis which, in effect was truly eloquent.

The interest of the occasion was greatly enhanced by the circumstance that the new Chancellor, the Rev. S. D. Burchard, D. D., of New York, was to be inaugurated; and the friends of the institution from the surrounding villages and cities were present, anxious both to see and to hear. The day was pleasant, though warm, and the large hall or chapel of the University was crowded to its fullest extent. The people were not disappointed—the music, the service, the charge to the new incumbent and his own address, were all appropriate, highly satisfactory and worthy the occasion.

Dr. Burchard is the well known and highly esteemed pastor of the 13th-street Presbyterian Church, of this city; and we are happy to learn that his new relation will not call him from his old friends and field of labor. His residence, as before, will be with us, but he will be expected, once a year, at least, to visit Le Roy, and take a paternal interest in the institution, presiding at its board of council and on the day of commencement.

Degrees were conferred upon eight young ladies, members of the senior class, by the Chancellor, who addressed them out of the fullness of his heart, in a most touching and beautiful manner; the degree of D. D. upon Rev. Josiah Crofts, of the Established Church, York, England, and upon Rev. Wm. L. Parsons, who, with his excellent lady, is to be hereafter connected with the institution at Le Roy.

COST OF PATENTS.

Although the prices for almost every kind of produce, merchandise, labor or professional service, have been greatly increased during the past few months; and although many of the patent agents throughout the country have advanced their charges nearly double, the many friends and patrons of MUNN & Co. will be glad to learn that we have not yet been compelled to augment our rates for obtaining patents. Nothing, however, but our immense and increasing run of business has enabled us to maintain the old prices, for in common with everybody else we are obliged to pay more than double former prices for drawing-paper and all kinds of materials used in our business.

We have always endeavored to preserve in our establishment the means and capacity for doing much more business than is ever likely to present itself during a given period; so that our increased expenses consequent upon increase of business are chiefly confined to the additional materials consumed.

We are now obtaining from one-third to one-half of all the patents that are granted in this country; and our business facilities are such that we could without any difficulty prepare all of the applications that are filed at the Patent Office. This is the aim that we now have in view; and if the public confidence in our efforts continues to increase as rapidly in the future as it has in the past, our aims will ere long be fully realized. Nine-tenths—almost all—of the patents now secured in foreign countries, by American citizens, are obtained through the SCIENTIFIC AMERICAN PATENT AGENCY; and we intend soon to secure the same ratio in respect to home patents. There are a number of small patent agencies scattered about in various sections, who eke out a scanty subsistence by decrying our extensive efforts to serve the public. They tell the credulous that we attend to so much business that we cannot do it well, etc.

Now the truth is, we execute all forms of patent business in the most superior manner, simply because we have so large a share of it to do. We are enabled to employ the very best talent which the world affords, and the question of the expense is to us a secondary consideration. We not only intend to do the largest share of business but it is our highest pride to execute it in the best manner. The corps of writers and draughtsmen at this moment employed in the SCIENTIFIC AMERICAN Office is unequaled in number, ability and experience; the evidence of which is seen in the widely-extended favor which our house has always enjoyed before the public.

THE fires in the Wisconsin woods destroyed $150,000 worth of property in the northern counties of that State. Several villages were burned.

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THE MACKAY GUN.

A good deal of attention has been attracted in England to a gun invented by Mr. Mackay, in which the projectile was not to have any projections fitting into the rifle grooves of the gun, the rotary motion being imparted, it was claimed, to the shot by the force of the gases rushing in a spiral course around it through the windage. It has been stated that the gun has proved exceedingly efficient in experiments against iron targets. The *Mechanics' Magazine* publishes a communicatlon in relation to the gun, so intelligent and sensible that we make room for the following extracts:—

"It is a well-known fact constantly referred to in the reports of gunnery experiments, that, whilst the average initial velocity of round shot fired from the old smooth-bore is 6,000 feet per second, that of projectiles from the improved (?) and costly rifled cannon of modern invention is 1,200 feet per second. Squaring these quantities the respective forces of the two descriptions of guns are represented by the number 256—144, or nearly 2 to 1 in favor of the old service gun. This enormous disparity of force is in some measure due to the heavier charges used with smooth bores, but that results from the fact that no rifled cannon in the service can be consecutively fired with safety with a charge exceeding $\frac{1}{6}$th the weight of the projectile; it is frequently only $\frac{1}{8}$th or $\frac{1}{10}$th, whilst the ordinary service charge of smooth-bores is $\frac{1}{4}$th, and in the case of the strongest class of these guns it may be $\frac{1}{3}$. Thus a smooth-bore cast-iron gun, which costs about £100, produces greater initial force, and consequently is a more destructive and efficient weapon, than a built-up wrought-iron or steel gun, which costs about £300. Accuracy at long range is another question, but whatever the range, the force-shot is subordinate to the initial velocity.

"In this comparison service ordnance are alone referred to; no account is taken of monster guns, which are in their infancy, and whose life does not promise a long duration.

"It is inconceivable that the scientific artillerists of the day should be regardless of the most important constituent of a pertect rifled gun. They seem with one accord to have made up their minds that 1,200 to 1,300 feet per second is the highest velocity which can be got out of a rifled gun. Captain Blakely, perhaps the most practical manufacturer of them all, declared at a public discussion on rifled artillery, that in his opinion 'the mode of rifling was of no more value than the paint on the gun.' I suppose he meant they were all equally bad. This may, however, be taken as the expression of the idea on that subject of the whole body of artillerists. It probably is founded on the uniformity of the results obtained from plans hitherto tried. But no account seems to have been taken of the circumstance that the systems adopted are all of a forcing character—some by sudden compression or extension of soft metal, others by mechanical fit—but all, to use the words of Mr. Anderson, the Superintendent of the Royal Arsenal, 'putting heavy strain on opposite sides of the gun, and tending to split the iron asunder.'

"Mr. Mackay, it appears, has devoted his attention to this subject. He has produced a gun with which rotation of the projectile is obtained without causing, it is alleged, any strain on the barrel beyond that caused by the explosion of the charge. He fires a smooth cylindrical projectile from a gun with grooves in the bore. These grooves are very shallow. In the trial-gun, of which the caliber is 8 inches, there are 12 grooves, 1-40th of an inch in depth, and 12 bands, each 1 inch wide. The twist or angle of spiral rifling is very quick, making $2\frac{1}{2}$ turns in the length of the bore, which is about 10 feet. The cylindrical shot weighs 160 lbs., and has been fired with charges of 35 and 30 lbs. Under these conditions, according to Mr. Mackay's theory, rotation of the projectile is produced by the action of the gas passing through the spiral grooves laying hold of the shot and causing it to spin as it passes out of the bore. Many engineers are of opinion that the rotation is due solely to the friction of the shot on the edges of the grooves. In that opinion I concur. When a body is in motion at a high velocity, rubbing against the surface of another body which is stationary, the slightest irregularity of the surface of either will alter the line of motion of the former, and if the obstructions, however trivial, are in one direction, the moving body will take their direction. This explanation appears to be more reasonable than the gas theory.

"Be that as it may, we have rotation produced by a method, which, contrary to all other tried systems, it may be assumed neither puts a strain on opposite sides of the gun, nor obstructs the passage of the projectile out of the bore. except to the extent that the friction before referred to may produce those effects.

"This plan is represented as a new phase in gunnery of which Mr. Mackay is the inventor. That statement might be questioned, but this is not the place for doing so. With reference to the public service, the essential point is the character of the results obtained in the experiments at Crosby Sands, near Liverpool. It is claimed as a remarkable exploit that the projectile penetrated and crushed through an armor-plated target with extraordinary facility. To form a correct judgment on the performance of the gun, we must take all the circumstances into account, and compare them with those of other experiments. If this be done fairly, it will be apparent that the gun could not be expected to do less than it did.

"The projectiles, weighing 160 lbs., were of hard and tough steel highly polished, the charges of 35 or 30 lbs. were in the proportion of one-fourth to one-fifth of the weight of the shot. The windage was extremely small, amounting to about 1 per cent of the area of the cross-section of the shot, whereas the ordinary windage of a smooth-bore gun is 5 per cent, so that the explosive force of the gas was immensely increased. Experiment has proved that with a given proportionate weight of shot and charges fired from a smooth-bore the initial velocity, which, with windage of 5 per cent, was 1,500, was, by reducing the windage to 1 per cent, increased to 2,000 feet per second.

"On the other hand, the target fired at was of the *Minotaur* type (the *Agincourt* is a sister ship), consisting of 5½-inch plates on 9 inches of teak, and the *Warrior* skin and frames—a description of armor-plating which miserably failed at Shoeburyness, having been demolished by a few rounds of cast-iron shot, which failed to penetrate the *Warrior* target.

"If we look at other target trials, we find that steel projectiles of 150 lbs. weight, fired with charges of 30 and 35 lbs. of powder, and more windage than that allowed by Mr. Mackay, played the same havoc as that produced by his gun with armor-plating much stronger than that of the *Agincourt*, which is allowed, by the Government authorities, to be the weakest of all the systems tested.

"The experiments in question were of the same objectionable character as those by which the public and the authorities have been often misled. A startling result is obtained. For the moment nothing but that result is seen or considered. The performance of the Armstrong 110-pounder was for a long time the theme of the most extravagant encomiums, but they lasted only so long as the gun encountered a resistance inadequate to its force.

"So it may prove with Mr. Mackay's gun. Its apparent success may be attributable to the combination of firing a heavy projectile of hard steel, with a heavy charge and little windage, at a short range against a target offering little resistance.

"The initial velocity of one shot was stated to be 1,640 feet. But regarding the action of the gun as that of a smooth-bore, which is the right way, since there was no rifling on the shot, and taking into account the charge and the small windage, the velocity ought to have been much greater. As that was not the case, one is led to infer that the friction of the shot against the edges of the grooves in rotating in the gun, absorbed a large portion of the explosive force. As to range and accuracy at long ranges, nothing is yet proved. Whether the spin of the shot is of that steady and uniform character which will be maintained at long distances, and can be relied upon for precision of aim, is not known. These points have yet to be tested, and will no doubt soon be cleared up, as the gun, it is understood, is to be transferred to Shoeburyness, where it will undergo a series of experiments under the supervision of the Ordnance Select Committee."

THE yield of thirty-seven silver mines in Nevada Territory is estimated at $1,000,000 per month, of which the Gould & Curry mine furnishes $450,000.

Seal Fishing off Newfoundland.

A fleet of three or four hundred vessels, chiefly brigs, goes out every spring about the first of March from St. Johns, N. F., to engage in the business of catching seals. The field of operations is the floating ice that comes down from the North at that season. The men advance upon the fields of ice in couples—so that one may assist the other in case of accident.

They kept to the leeward of the ship, else they might lose her, as indeed sometimes happens in the dense fogs. About the 7th of March the young seals are found about the size of cats, mewing on the ice. They are not yet fit to be taken, but by lying in the sun and sucking the ice until about the middle of March they gain three inches of fat. Then commences the slaughter. The men walk up to the white coats, as the young seals are then called, and knock them over, by striking them on the forehead with a long pole, stick them with a knife, cut them down the breast, and the carcass rolls out, leaving the skin and fat which are all the seal-catcher is after, the carcass being left on the ice. Usually in about the last week in March the seals begin to dip, they take to the water, and are then only to be captured by shooting from the boats.

Old seals are invulnerable unless shot in the forehead, and nature has provided them with a means of defense even here, in the shape of a "hood," which they drop on occasions—hence their name, "old hoods." So the season of catching them is but about three weeks in duration. Then men often go five or six miles from the ship on the floating ice. They get one-half they catch, sometimes making a good trip, at other times getting nothing. One spring a crew that were out three weeks and three days, shared $135 apiece. A brig of 150 tuns will take as a crew about forty men, who are provided by the merchant fitting out the vessel with a full supply of provisions, and all things necessary for the prosecution of the voyage, in return for which each man pays a small sum, called "berth money;" and should the voyage prove unfortunate, the merchant has to stand the loss of the entire outfit. It is a dangerous occupation, for the brigs are liable to be crushed in the ice, though they are strongly built. The fat of the seal, after being brought into port, is cut into small pieces, placed in large vats, and left to drain off to oil, which is an article of commerce. The skins are used for various purposes.

Aerated Lemonade.

Cooley states that the best lemonade of the London makers is prepared by putting 1½ fl. oz. of rich lemon sirup into each bottle, which is then filled up with aerated water at the bottling machine. A good lemon sirup for this purpose may be made by the Ph. L. process, omitting the spirit, and aromatizing by adding 30 to 40 drops of essence of lemon, or 1 fl. oz. of a strong tincture of fresh lemon-peel. We find the following form in our note-book, but as we have not tried it, we cannot say what sort of lemonade it furnishes:—Take of tartaric acid 1 oz.; essence of lemon, 20 drops; simple sirup, 1 gallon. Rub the essence with a little sugar, and afterwards with a portion of the sirup; and having dissolved the acid in a small quantity of water, mix the whole thoroughly together. One pint of this is sufficient for two gallons of carbonated water.

Possibly some of our practical readers will supply us with a good working formula for aerated summer drinks.

ENGLISH PEALS OF BELLS.—A correspondent of the *Builder* says:—"We have now in London and different parts of the United Kingdom about 14 peals of twelve bells; 50 peals of ten bells; 600 peals of eight bells; 700 peals of six bells; and about 400 peals of five bells; and a great number from one bell to a chime of four bells; and all these peals of five to peals of twelve bells cost each from £300 to upwards of £2,500. So you see what a merry ringing island England is; and a melodious peal of bells is perhaps not less captivating than the finest toned instrument ever yet invented."

ENGLAND imported a hundred million eggs in the last four months, against eighty million in the same time last year. In the single month of April she imported 42,650,000 eggs, while the number in April, 1863, was 28,540,000 only.

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Improved Manure-spreader.

This useful invention is well adapted to the wants of farmers, and is so constructed as to answer the purposes of a convenient manure-spreader, and yet be afforded at a low price, for it can be attached to any wagon or cart generally used about a farm. This feature alone will no doubt recommend it to all farmers.

The details are not complicated; they consist merely of a tail-board or hopper, A, hinged to the back end of the cart, and provided with a winch, B, and an arm, C; by the aid of these fixtures the contents of the cart can be distributed equally and evenly, for as the manure is drawn out the tail-board is lowered, so that the contents are fed regularly to the revolving toothed drum, D. This latter appurtenance is driven by a friction wheel, E, which runs on the tire of the cart-wheel and communicates motion to the picker, D, by the rag wheels, F, and chain, G. Thus, it will be seen that as the cart advances the toothed picker, D, draws the manure down to an opening, H, between the tail-board and the cart-tail, from whence it falls on to the chutes, I (see Fig. 2), which distribute it in the trenches or about the hills as may be desired. The opening is graduated by the movable slide, J, and there is also a toothed plate, or its equivalent, placed near the picker, D, so that the teeth will be cleaned each time and not become clogged from any substance that may attach to them. A handle may be applied to the squared ends of the shafts the rag wheels, F, are on, and the manure spread by hand on any part of the field that requires more than others. In the engraving the machine is shown attached to an ordinary coal cart. This machine was patented on May 17, 1864, by Philip Eley, through the Scientific American Patent Agency; and further information may be had by addressing him, care of E. J. Richmond, No. 508 Pearl street, New York.

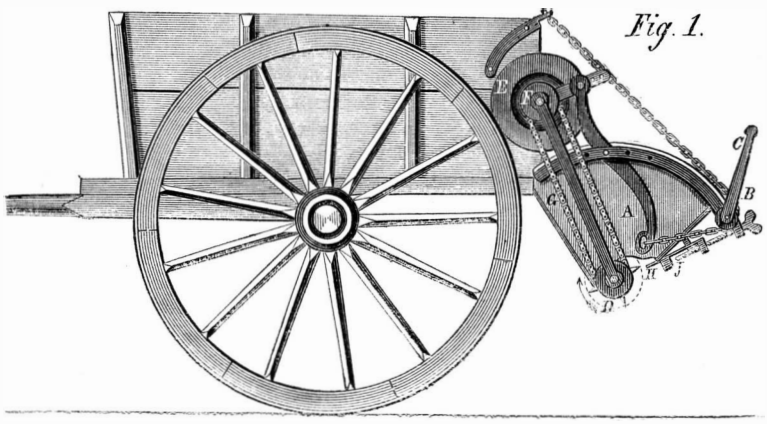

Fig. 1.

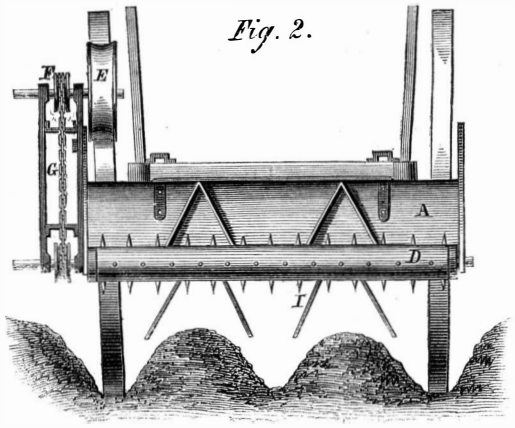

Fig. 2.

ELEY'S MANURE-SPREADER.

Improved Piston Packing.

To pack a steam piston properly, requires a great deal of time and attention, and unless the person attempting the operation understands it thoroughly he is apt to make a bad job of it. In order that pistons may be packed quickly and well very many devices have been invented by the aid of which the duty may be performed by simply turning a screw, or its equivalent. In the accompanying engraving a method of packing the piston is shown which is as simple and efficient as any of its class that we have ever seen. When it is known that the piston leaks, the packing causes the wedge, E, to strike against the bolt, F, and thus push the springs out. An index on the outside of the cylinder-head shows the extent to which the packing has been tightened. These details are very simple. The nuts and rack may be cast with the teeth on, and the several parts are easily made by any ordinary workman. They are readily kept clean and free from gum, and will doubtless give good satisfaction. This invention was patented through the Scientific American Patent Agency, on June 7, 1864, by J. Randolph Abbe, of Providence, R. I. State and county rights are for sale; for further information address the inventor as above.

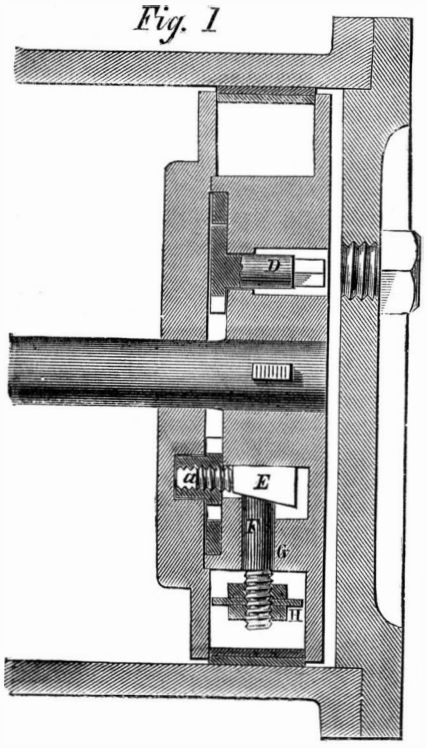

Fig. 1

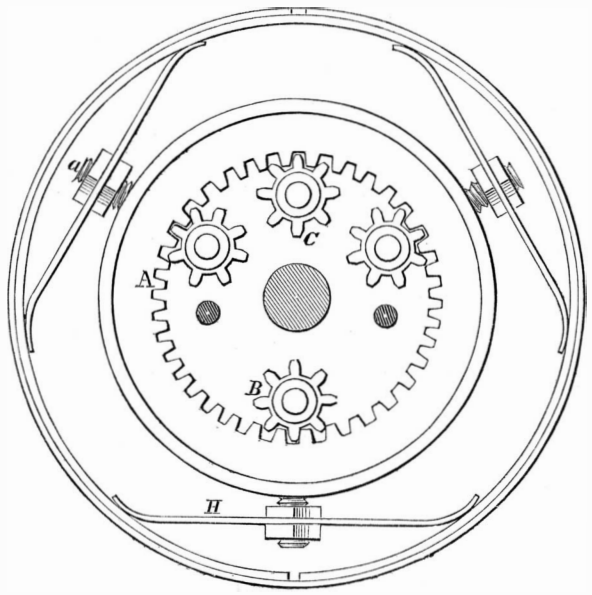

Fig. 2

ABBE'S PISTON PACKING.

Coffee, a Preservative of Milk.

M. Berthond states that exactly a year ago a chemist, a friend of his, in his presence placed three vessels on his window-sill, two containing pure milk just drawn before their eyes, and the third having equal parts of the same milk and black coffee. The vessels were covered with little boards to prevent the dust from falling upon the liquids, and before the end of the day the pure milk had turned, while the mixture of milk and coffee remained in the same state. At the end of the year, that is a few days ago, the vessels were again examined, when those which had contained pure milk were found covered with all kinds of moldy vegetation, without a trace of milk or caseous substance in them, while the milk and coffee not only presented no change of appearance, but had exactly the same taste it had when fresh.

Scientific.

Among the passengers by the *Smyrniote* were Messrs. Wm. T. Brigham and Horace Mann, who have been sent out by the Lawrence Scientific School of Harvard University, and by the Smithsonian Institute of Washington, for the purpose of making a scientific exploration of these islands. Their plan is to collect specimens of all the bugs and insects, land and sea shells, fishes, birds, etc. These specimens are designed to enrich the museums of those institutions. In addition to this service, for which they specially came out, they are prepared to undertake a geological survey of the islands, should the Hawaiian Government authorize one to be made. Now, while qualified persons are on the ground, ready to engage in such a work, would it not be well for the Government to secure their services? The oft-mooted question whether gold exists in Koolau can now be definitely settled, and the investigation might result in finding some other mineral ore, or, what would be still more valuable and not at all improbable, in finding coal deposits. The discovery of coal on these islands would enhance the value of real estate at least 100 per cent, and give great impetus to every branch of business.—*Commercial Advertiser, Honolulu, Sandwich Islands, May* 14, 1864.

To Keep Honey.—M. Sands, Orange county, N. Y., directs to heat strained honey to the boiling point, and store it in covered jars, where it will keep without candying. To prevent danger of burning, set the vessel in which it is to be heated into another containing water.

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NEW YORK, SATURDAY, JULY 23, 1864.

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VERSATILITY AND SKILL OF AMERICAN MECHANICS.

A recent paragraph in a contemporary asserted that mechanics in this country were slovenly in their execution and that they only half-learned their trades; as a consequence, the credit of manufacturers and of the nation suffered. The originator of this slander could have had little acquaintance and no sympathy with our working-men. If he had circulated among them as we have been with them in their workshops, their homes and places of amusement—if he had identified himself with their feelings, and thoroughly understood their characters, he would have thought twice before publishing his untruthful assertions, or, better still, erased them before the ink was dry upon the paper. He would have stifled the slander in its birth, before sending it out to prejudice us among other nations, all too ready to disparage everything American.

The assertion is not true. American workmen are, at home certainly, notorious for their skill, thoroughness and versatility. They are fertile of resource, quick to foresee difficulties and avoid them, and the record of the Patent Office is the fullest proof that they are untiring and incessant in their efforts to improve themselves. And not this alone, but to regenerate society, in one sense, by increasing and cheapening the product of labor.

In any machine shop, we shall find men who can work at the vise, the lathe, planer, slotting-machine, shaper, foot-lathe, screw-cutter, boring-mill or gear-cutting engine, with skill and exactness, and who could transfer themselves from a machine they knew by heart, so to speak, and run another on wholly different principles after two minutes' inspection—men who can make a lathe or a knitting-machine, a steam-engine or a plow-share, and who not only know how to use tools, but also make them, and can forge and temper sufficiently well for all practical purposes.

A Jack-of-all-trades is master of none, but such men are not "Jacks," they are masters of their *own* trade, and know it from *alpha* to *omega*. Army officers—those educated at West Point, for example—have had occasion to test the truth of these assertions severely, and railroads that have been cut, or captured, have been put in running order in a few hours notwithstanding the efforts of the rebels to disable them by carrying off important parts of the machinery.

Captured blockade-runners are taken in charge by our acting engineers, and brought home without delay, despite the fact that the engines are new to our men. Those persons who innocently suppose steam-engines are all alike cannot appreciate the care, anxiety, and responsibility which attends the prize-engineer in bringing a strange vessel home; but we do, and have often wondered that these men have been so uniformly successful in their efforts.

Go into any cabinet-maker's shop in the country and ask to have a small pattern made for the foundry, and there is no doubt but that the piece will be obtained, and of first-rate workmanship; yet cabinet-making and pattern-making are widely different trades. Our mechanics in small towns will execute any job, from putting up a building to repairing an obstinate pump, and whole communities depend upon one man sometimes to supply their necessities in this respect.

To return to the machine shop again. Contracts to do different parts of steam-engines, or sewing-machines are eagerly sought for by our workmen. How well they are executed let the machines and the demand for them answer.

It is needless to pursue the subject further. Those who honor and respect labor, who deem the workman worthy, not only of his hire, but of sympathy, esteem and encouragement, will leave no effort untried to elevate him in public estimation, or defend him from the aspersions of ignorant or malignant (because ignorant) individuals.

MOLASSES.

Every one of our readers has probably observed the hygroscopic property of molasses. When molasses candy is first made it is dry and brittle, but if it lies a few hours exposed to the air it becomes soft, sticky, and limber; this results from its hygroscopic property—its affinity for water—its absorption of moisture from the atmosphere. When the little cakes, called ginger snaps, are taken from the oven, they cannot be bent without breaking, but in the course of a day the molasses which they contain absorbs so much water from the air as to make them moist and soft.

It is possible that a valuable patent might be secured for some mode of protecting sticks of molasses candy from the action of the atmosphere, and thus preserving them in their dry and brittle condition. Perhaps a thin coating of gum-arabic, or other edible gum, might answer the purpose.

Molasses is used in the making of printer's rollers, its hygroscopic property preventing the rollers from drying. It is probable that if more general attention was called to this property of molasses, many other applications might be found for the substance. For instance could not a small proportion of it be used in the composition of sculptors' clay, to prevent the great labor and care required in keeping the clay moist while the artists are forming their models?

In the laboratory the substances most frequently employed to absorb water are the chloride of calcium, quicklime, and sulphuric acid, all of which are highly hygroscopic. Quick-lime is also used in distilling to extract from the alcohol a portion of the water which cannot be separated by the process of distillation.

FINANCIERING.

There is an impression, almost amounting to a superstition, that financiering is a difficult and mysterious art. It is, in truth, the simplest of all the departments of commerce. Laying aside all technical terms, financiering is nothing more than the art of borrowing money. There are but two steps in the transaction; the first is to find some person with money to lend, who is satisfied with your securities; and the second is to agree upon the rate of interest.

The poor washerwoman who "spouts" one of her kettles at the pawnbroker's goes through both steps of financiering, and the process is no simpler than that of the merchant who has a note discounted at the bank. If the washerwoman pawns the clothes of one of her customers, trusting to redeeming them by pawning the clothes of the next customer, she makes an operation which is very closely parallel to that most mysterious of all financial operations—"kite-flying."

General Jackson remarked, that "men who do business on borrowed capital ought to fail." Though this hard-hearted maxim has been denounced beyond measure, it certainly has the sanction of Providence, for they nearly all do fail. The statistics of General Dearborn show that out of every hundred men who do a credit business, ninety-seven become bankrupt. Famous financiers are especially certain to fail. We never knew one, from Nicholas Biddle down, who did not finally run out. The really shrewd and thrifty men, such as A. T. Stewart and James Gordon Bennett, never have any occasion to borrow money—to financier. Financiering is simple—and they are simple who practice it.

MAKE HASTE SLOWLY.

There is an old Latin proverb (*Festina lente*) which says, "hasten slowly." It is rarely that we find two words which express so much or contain more food for thought. As a nation we make haste too fast, and should do better to go much slower and more surely to our goal. Some individuals manifest this disposition to hurry over important things differently from others, but the application of the fault alluded to may be understood by the following illustration:—Suppose a person to require information upon some subject he is comparatively ignorant of—the steam engine indicator, for instance; having procured a book upon it, he runs his eye over page after page, touching first upon this example, now upon that, until he arrives at the end, when he knows nothing whatever of the subject. The first time he undertakes to converse upon the instrument or to apply its principles practically, he discovers his ignorance, and is put to shame or inconvenience. All this is wholly the fault of making haste to reach the end, without grasping the fundamental principle and mastering it, and each detail also, before going further. It is absurd to suppose that any matter worthy of study can be mastered in a cursory examination, yet very many persons relinquish the pursuit of knowledge in despair from this very cause. Finding it impossible to comprehend in fifteen minutes some point it has taken an author as many days, and weeks, probably, to settle, they deem the matter beyond their comprehension, and throw up the study never to return to it.

There may be some gifted spirits to whom the knotty points of a new theory or the intricacies of an unfamiliar science, are clear and plain at first sight, but the mass acquire knowledge only by patient study, not by a hand-gallop through the fields of learning.

When sensible men go abroad to acquire information in foreign countries they do not take express trains and steamboats, and whirl onward to the end, but staff in hand they penetrate into village and hamlet, and learn from the peasant and the prince. So it is with those who study to learn and retain what they read. Patient plodding by the wayside is better than running from pillar to post, and the truth of this assertion is manifest to all who have ever given the subject attention.

APPEARANCE OF THE SUN FROM THE NORTH POLE.

To a person standing at the north pole the sun appears to sweep horizontally around the sky every twenty-four hours without any perceptible variation during its circuit in its distance from the horizon. On the 21st of June it is 23° 28′ above the horizon, a little more than one-fourth of the distance to the zenith, the highest point that it ever reaches. From this altitude it slowly descends, its track being represented by a spiral or screw with a very fine thread, and in the course of three months it worms its way down to the horizon, which it reaches on the 23d o. September. On this day it slowly sweeps around the sky with its face half hidden below the icy sea. It still continues to descend, and after it has entirely disappeared it is still so near the horizon that it carries a bright twilight around the heavens in its daily circuit. As the sun sinks lower and lower, this twilight gradually grows fainter till it fades away. On the 20th of December the sun is 23° 28′ below the horizon, and this is the midnight of the dark winter of the pole. From this date the sun begins to ascend, and after a time his return is heralded by a faint dawn which circles slowly around the horizon, completing its circuit every twenty-four hours. This

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dawn grows gradually brighter, and on the 20th of March the peaks of ice are gilded with the first level rays of the six-months' day. The bringer of this long day continues to wind his spiral way upward, till he reaches his highest place on the 21st of June, and his annual course is completed.

THE MONITOR SYSTEM.

Mr. John Ericsson has written us a letter in which he positively refutes the statements that have appeared in some of the daily papers, and which have been re-echoed abroad, concerning the inefficiency, cost, and general worthlessness of the monitor system.

Captain Ericsson states truly that we have been able to put a fleet of iron-clad ships afloat without one dollar of expense for experiments. The total cost of the monitor fleet now afloat is very little over $12,000,000. The English experiments with the Armstrong breech-loader and other ordnance (which by late English advices appear to have been condemned), cost more money than this.

It is also claimed that the latest experience with these vessels at sea completely disproves the assertion that they are unseaworthy. The report that the monitors cannot use their guns in a sea-way, or open their ports is not correct. The mechanical arrangement provided to permit the ports to be opened can only be used on the turreted ships and not on broadside iron-clads. The *Dictator* can carry coal enough to go to St. Petersburgh, Russia, if necessary, and with 800 tuns of water in her coal-bunkers and ready for steam, her gun-wale is four feet above water.

Captain Ericsson concludes by saying that the European Powers are well aware of the value of the monitor system, and that two fleets of iron-clads, *precisely* like ours are now being built on the Baltic sea; one on the eastern and the other on the western slope.

WAGES PAID FOR SKILLED LABOR.

Workmen and laborers are now receiving comparatively high wages in this city, or what would have been high had the price of provisions, etc., remained at reasonable figures. As it is, the compensation is small, and we shall doubtless hear of interruptions until the prices are adjusted more equably. Even now there is discontent, and we advise all those workmen who have good steady employment to remain where they are, as there seems to be plenty of men here now in most branches of trade.

Machinists, vice hands, receive on an average $2·70 per day of ten hours, overtime extra; metal-turners, $2·80; molders, $2·80; coppersmiths, $3; pattern-makers, $2·80; blacksmiths, $2·90; painters, $2·25; carpenters, $2·50; boiler-makers, $2·75 to $3; printers, on daily papers, consider it a poor night's work if they do not make $5—their work being paid for by the 1000 ems—but the average pay by the week is $16; conductors on our city cars receive $2 for twelve hours' work, and there are too many applicants seeking for the places.

These prices, it will be remembered, are not the outside, but the average rates. Very many machinists receive $3 and upwards, but they are extra good workmen. We have given the prices as they are paid in our large machine-shops.

REBEL IRON-CLADS.

The *World* publishes a long account of what it calls "a formidable rebel iron-clad;" said iron-clad, consisting of railroad iron, as usual, laid in tiers one after the other. It has somehow happened that the rebel iron-clads cannot find a favorable opportunity to sink our wooden vessels, and, notwithstanding their tremendous powers of offense, they prefer the certainty of safety in port to the certainty of being sunk if they venture to attack us. A fourth-rate wooden gun-boat (the *Sassacus*) recently drove one of these terrible iron-clads back to her dock, and, although we frequently hear of the existence of more of these dangerous crafts, we fortunately escape being sunk by them.

There are no formidable rebel iron-clads in existence, nor will there ever be, so long as railroad iron is used to plate them with.

THE HECKER AND WATERMAN EXPERIMENTS.

In our last number we published an account of four series of experiments of 30 hours each, the steam being cut off at different points in the stroke. In that account we gave the most important elements in the experiments, but as intelligent engineers may like to know some of the other conditions, we complete this week the history of the experiments by a statement of all the observations which were not given in our last issue, together with the calculations of the fuel and water consumed, and work done per hour and per minute.

The mean revolutions of the fan per minute during each 30-hours run were with—

⅞ths cut-off	68·45
⅔ds cut-off	68·4
½ cut-off	68·34
¼th cut-off	68·41

The consumption of fuel per square foot of grate surface per hour was with—

⅞ths cut-off	9·000
⅔ds cut-off	7·80
½ cut-off	7·380
¼th cut-off	6·710

The pressure of steam in cylinder at point of cut-off was given last week; the mean pressure in the cylinder at end of stroke was with—

⅞ths cut-off	24·042
⅔ds cut-off	19·184
½ cut-off	18·170
¼th cut-off	14·846

The total horse-power developed by the engine per indicator, including overcoming back pressure against piston, was with—

⅞ths cut-off	11·752
⅔ds cut-off	11·639
½ cut-off	12·121
¼th cut-off	11·682

The mean back pressure against the piston during its stroke, in pounds, was with—

⅞ths cut-off	4·05
⅔ds cut-off	4·87
½ cut-off	3·83
¼th cut-off	3·37

The gross *effective* horse-power, per indicator, was with—

⅞ths cut-off	10·079
⅔ds cut-off	9·631
½ cut-off	10·509
¼th cut-off	10·288

The net horse-power applied to fan was with—

⅞ths cut-off	8·839
⅔ds cut-off	8·392
½ cut-off	8·889
¼th cut-off	9·049

The pounds of feed-water consumed per hour, per total indicated horse-power, were with—

⅞ths cut-off	47·140
⅔ds cut-off	42·904
½ cut-off	40·063
¼th cut-off	36·691

The pounds of combustible consumed per hour, per total indicated horse-power, were with—

⅞ths cut-off	5·525
⅔ds cut-off	4·822
½ cut-off	4·309
¼th cut-off	4·143

Temperature of feed water, with—

⅞ths cut-off	108·22
⅔ds cut-off	107·15
½ cut-off	107·15
¼th cut-off	104·42

Temperature of water discharged by the air-pump, with—

⅞ths cut-off	111·26
⅔ds cut-off	110·03
½ cut-off	110·07
¼th cut-off	10[illegible]·56

Vacuum in condenser in inches of mercury, per open gage, with—

⅞ths cut-off	26·25
⅔ds cut-off	26·67
½ cut-off	26·53
¼ths cut-off	26·01

These facts, with those published last week, will enable the lesson of this series of experiments to be fully understood. Next week we shall give the history in full of another series.

Sailing of the "Fire Queen."

On Saturday, July 9th, the splendid new steamer *Fire Queen*, Capt. Henry W. Johnson, commander, sailed from this port *via* St. Johns for Shanghai, China. Among the passengers was Mrs. Johnson, the commander's beautiful young wife, who, for a second time, accompanies her husband to the Chinese Empire. The *Fire Queen* is the fifth steamer built by Capt. Johnson for the Chinese trade, and she is a very superior first-class vessel, 300 feet in length. Her arrangements and decorations are superb, and if she reaches her destination in safety—of which there is but little doubt under her experienced commander—we think she will astonish the natives of the Celestial Empire somewhat. The best wishes of the many friends of those on board attend them on their long voyage.

It is said that five hundred men are now hard at work on both ends of the Hoosac tunnel.

How to turn Greenbacks into Gold.—Send three dollars of them to this office and thus enjoy a year's subscription to the Scientific American. Ten to one that the information you thus obtain will result in bringing into your coffers, before the year is out, a hundred times more money in gold, than the amount of your first investment.

Messrs. Hurd & Houghton, 401 Broadway, New York, have sent us a copy of a neatly-bound pamphlet containing the evidence given in the *Chenango* boiler explosion. Every engineer should send for a copy of the work, as it contains a great deal of information.

ISSUED FROM THE UNITED STATES PATENT-OFFICE
FOR THE WEEK ENDING JULY 12, 1864.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.

43,466.—Process for treating Hair.—William Adamson, Philadelphia, Pa.:

I claim simultaneously drying and deodorizing the hair of hogs and other animals by subjecting it to the direct action of the products of combustion of coal or other fuel, substantially in the manner described.

43,467.—Machine for Spinning and Reeling.—George Albright, Oskaloosa, Iowa:

I claim, first, The movable frame, B, carrying a series of spindles, C, in combination with the rising and falling clove-frame, G, reel, I, and with a recess in the top cross-bars, c c', of the main frame, A, and pins, n, projecting from the front side of said main frame, all constructed and operating in the manner and for the purpose substantially as herein shown and described.

Second, the adjustable clasp, l, in combination with the rising and falling clove-frame, G, and spindle frame, B, constructed and operating in the manner and for the purpose substantially as set forth.

[This invention consists in a movable frame containining a series of spindles so arranged that it can be changed from a horizontal to a vertical position in combination with a vertically sliding clove frame and with a reel in such a manner that when such movable frame is brought in a horizontal position, the spindles are properly situated for spinning, and if the movable frame is brought in a vertical position, the spindles are properly situated for reeling.]

43,468.—Hydraulic Machine for washing Ore.—Joseph M. Allinwood, Timbuctoo, Cal.:

I claim, first, The insertion of the diaphragms or guides, inside of the pipe for preventing the water from forming a spiral column or stream at the instant of discharge;

And secondly, The combination of the parts set forth accompanying this specification, constituting a new and improved machine.

43,469.—Metallic Sole-plate for Boots and Shoes.—Francis W. Bacon, Jersey City, N. J., and Solon Dike, New York City:

We claim a corrugated steel or metal shank and plate with a counter turned up around the heel at any desirable height, and all from the same piece of metal as shown in Figs. 1 and 2.

43,470.—Cultivator.—Frank Barney.—Bloomington, Ill.:

I claim the hand lever, H, with its swivel fulcrum, K, in connection with the crank shaft, G, hinged rear standard, E, and swivel front standards, E', all constructed and operating in the manner and for the purpose substantially as herein specified.

43,471.—Valve Gear for Steam Engines.—Henry and Frederick J. L. Blandy, Zanesville, Ohio:

We claim the method of connecting the valve rod, a, with the eccentric strap, G, by means of the off-set arm, c, diagonal brace, I, and rod, H, forming a frame which is jointed to the end of the valve rod substantially as described and represented.

[This invention consists in an improved arrangement of the valve chest and valve, and of the connections between the valve rod and eccentric, whereby the power to drive the valve is transmitted in a more direct manner. The invention is applicable with more especial advantage to horizontal engines on which the valves are on the top of the cylinder, in which case it dispenses with the rock shaft commonly used in such engines.

43,472.—Sorghum Evaporator.—Caleb Bond, Richmond, Ind.:

I claim, first, The combination of the furnace, A, and the flues, D D', E E', one above the other with the dampers, a b c, and d d' d'', by which the heat is thrown at will against both, either, or neither of the pans, or against a smaller or larger portion of the rear pan, and at the same time avoid or infringe upon the forward pan.

Second, The vertically adjustable wooden rail, f, provided with hooks, f', in combination with the pan, G, as described for the purpose of attaching and operating a bag containing some clarifying materials.

[This invention relates to certain improvements in the means for regulating the draught and directing the heat in an apparatus for evaporating saccharine juices in a manner that either of the pans or both can be heated to any desired degree or cooled off at the pleasure of the operator, simply by changing the position of a few dampers, and without increasing or diminishing the fire. It also relates to certain improved means for removing the scum and clarifying the juice.]

43,473.—Musical Demonstrating Board.—Wm. H. and Geo. W. Bowlsby, Monroe, Mich.:

We claim, first, The sliding-bars and scales, B B, with their attachments, c c, and d d, in combination with the enharmonic scale diagram, G.

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Second, The movable note-pins, E, for the purpose set forth.
Third, The combination of the said device with a book and bound into it, as shown and described.
Fourth, The combination of all the devices for the purpose set forth

43,474.—Machine for filling Spools.—Wm. Breitenstein, New York City:

I claim the guide or arm, R, arranged as described and operating in the manner, and for the purpose substantially as set forth.
I claim supporting the spindle, J, with its pulley, H, so as to be capable of being lifted upward when arranged in combination with the guide or arm, R, and acting together substantially in the manner and for the purpose specified.

43,475.—Artificial Fuel.—Wm. Budd and J. L. Husband, Philadelphia, Pa.:

We claim the impregnating of corn-cobs with oil, as hereinbefore more fully set forth.

43,476.—Steam Boiler.—Wm. Budd and J. E. Husband, Philadelphia, Pa.:

We claim the counter-draft combustion chamber, bicket-ports or any opening in the nature thereof as counter-draft air holes to such chamber and the bonnet base smoke-pipe to form a counter-draft combustion chamber as hereinbefore more fully set forth.

43,477.—Turning Lathe for Wood-turning.—John Coleman, Argyle, N. Y.:

I claim, first, Arranging the knives, H′ and H″, upon the pivoted bed-plates, O and O′, as described, when said plates are operated by the hand-levers D and D′, and the eccentrics, E.
Second, The combination of the pivoted bed-plates, O and O′, with the eccentrics, E, which are operated by the levers, D and D′, or their equivalents for the purpose set forth.
Third, Gaging the concentric action of the knives, H′ and H″, by means of the set screws, n, tapped through the tie-bolts, c, substantially in the manner and for the purpose described.

43,478.—Grain Separator.—Jacob Chum, Shelby, N. Y., and George A. Fisher, Alabama, N. Y.:

We claim, first, Cleaning or separating grain by means of two or more endless belts, substantially as shown.
Second, We claim mounting the belts in such a manner that they can be inclined to a greater or less angle, substantially in the manner shown, when used for the purpose herein set forth.
Third, In combination with the endless belts, B, I claim the revolving brush, D, when the parts are arranged to operate as and for the purpose above set forth.

43,479.—Sheet-metal Can.—Hiram A. Cram, Whitestone, N. Y.:

I claim the combination of a flat metal disk or ring, A, provided with an annular flange, a, with the bottom of a sheet metallic can, when the said disk or ring is so combined by means of the binding hoop, C, in the manner and for the purpose herein represented and described.

43,480.—Hay Press.—G. W. D. Culp, Allensville, Ind.:

I claim, first. The combination of the beater, D, working in inclined ways, B B, with the box, A, in an inclined or horizontal position, substantially as described and represented.
Second, I claim an eccentric elliptical or other irregularly formed drum or roller, E, employed in connection with beater, D, and ways, B B, to apply an increasing power to elevate the beater, D, as explained.

43,481.—Mode of baling Hay and other Materials.—Edward Dorr, Rockford, Ill.:

I claim the mode of baling stalks and unmanufactured fibrous materials by winding the material progressively upon itself while under pressure, substantially as set forth.
I also claim the mode of forming ventilating openings in bales of stalks, and unmanufactured fibrous materials, substantially as set forth.

43,482.—Machine for baling Hay and other Materials.—Edward Dorr, Rockford, Ill.:

I claim the combination of a compressing shaft, lateral confining heads, platform and springs, operating to compress hay, cotton, and similar materials into a bundle or bale, substantially as set forth.
I also claim the combination of the preceding combination with a roller and springs operating to compress the material in the layer previous to its compression into the bundle or bale, substantially as set forth.
I also claim the combination of the first preceding combination with a conveyer, the whole operating substantially as set forth.
I also claim the combination of the first preceding combination with a carriage fitted with fingers, so operating that the material may be gathered and baled or bundled from the ground, substantially as set forth.
I also claim the combination of the first preceding combination with a carriage fitted with fingers and gathering mechanism, operating substantially as set forth.
I also claim the construction of the compressing shaft in two parts tapering in opposite directions, substantially as set forth.

43,483.—Washing Machine.—William M. Doty, New York City:

I claim the combination of the pivoted oscillating arms, B, inclined dash-board, D, removable hand lever, C, and stationary tub, A, all constructed and operating in the manner and for the purposes herein shown and described.

[The object of this invention is a mechanism for washing which can be readily introduced into the stationary wash-tubs, which are usually made of marble or other suitable material and permanently fixed in those rooms or apartments in which the washing is to be accomplished; said mechanism being provided with a dash-board which can be used for pounding or pressing the clothes, or which can be fastened in such a position that it can be conveniently used in place of the ordinary wash-board.]

43,484.—Variable Exhaust for Locomotives.—John Dykeman and John Bolton, Greenbush, N. Y.:

I claim the plates, C C C C, etc., fastened at their lower ends to the conical sockets, B, overlapping each other from a point near their attachment, and sufficiently numerous to make them readily approximate the shape of a frustum of a cone, without opening the joints in combination with the copps, E E, which by depression contract the nozzles, and by elevation admit of their expansion.

[The object of this invention is to provide for the contraction and enlargement of the exhaust outlets without breaking or changing the direction of the ascending column or columns of steam.]

43,485.—Fishing-line Reel.—Darwin Ellis, Waterbury, Conn.:

I claim the combination of the elbow-shaped lever and its appendages, with the wheel, Fig. 4, and pinion e, when the whole is constructed, combined, and fitted to produce the desired results, substantially as herein described.

43,486.—Heel-fastening for Skates.—H. N. Gallagher, Geneva, N. Y.:

I claim the plate, b, provided with one or more clamping screws, s, and plates, a, in combination with the crescent plate, d, when they are constructed, arranged, and operate conjointly in the manner and for the purpose described.

43,487.—Corn Harvester.—B. M. Fowler, Brooklyn, N. Y.:

I claim the employment or use of reciprocating scythes, E, in combination with the crank axle, C, wheels, B B′, track-clearers, F, and truck, A, constructed and operating in the manner and for the purpose substantially as herein shown and described.

[This invention relates to certain improvements in that class of machines which serve to cut standing corn. The invention consists in the employment or use of reciprocating scythes secured to the rear cross-bar of a truck which rests on four wheels, from the axle of one pair of which motion is transmitted to the scythes by means of a crank, pitman, and balance-lever, or by any other suitable mechanism, in such a manner that in drawing said truck through a corn field, by the action of the scythes the corn is cut, and the operation of cutting corn can thus be effected with little exertion and in a very short time.]

43,488.—Skate-fastening.—H. N. Gallagher, Geneva, N. Y.:

I claim, first, Making the side clamps, B and C, self-adjusting, laterally, by pivoting them to the foot-piece, A, as set forth and for the purpose described.
Second, Providing the pivoted clamp, C, with several adjustments laterally, substantially as shown and for the purpose specified.

43,489.—Fabric for the Manufacture of Enameled Collars, Cuffs, etc.—Henry E. Gibson, Camden, N. J.:

I claim the material, substantially as set forth, and its exclusive use in the manufacture of enameled shirt collars and similar articles of dress.

43,490.—Watch Case.—Fayette S. Giles, New York City:

I claim the bezil, e, and cap, f, combined with each other and with the case of the watch by means of the hinges, g h, block, i, and pivot, l, substantially as herein specified.

[This invention consists in a cap and bezil hinged together and attached to the case of the watch by means of a pivot upon which they are capable of rotating in planes perpendicular to the dial, whereby the use of a double-case can be dispensed with, and yet the case can be changed from a hunter to an open face, and vice versa, without detaching any of its parts.]

43,491.—Gas-pipe and Stair Rods.—Mitchel Gould, Newark, N. J.:

I claim, as an improved article of manufacture, a tube, constructed in the manner substantially as herein shown and described.

[This invention relates chiefly to the manufacture of ornamented or brass-covered tubes, for conducting gas. An ingot composed partly of brass and partly of iron is rolled and drawn into tubular form, the inner tube being composed of iron and the outer of brass. The claim describes the particular virtue of the improvement, which, it is said, results in great economy in the manufacture.]

43,492.—Wood-turning Lathe.—Timothy Gray, Lowell, Mass.:

I claim the tool stocks, H and M, with cutters attached, a b and e, in combination with the squaring-down and cutting-off cutters, c and d, and adjustable nut, f, on the transverse screw, g, and stop, j, or their equivalents, substantially as described and for the purposes herein set forth.

43,493.—Machine for mining Coal.—Wm. W. Grier and Robert H. Boyd, Hulton, Pa.:

We claim, first, One or more series of rotating augers, constructed substantially as described, for the purpose of mining coal.
Sebond, We claim mounting the augers, D, in the sliding frame, C, in combination with the adjustable frame, B, substantially as described.
Third, We claim adjusting the frame, B, by means of the hinged rods, c, screw bolt, b, and sliding collar, d, or their equivalents, substantially as shown.
Fourth, We claim having the driving shaft, G, in the swinging frame, F, substantially as and for the purpose set forth.
Fifth, We claim the combination and arrangement of wheel, E, shaft, I, provided with its pinion, i, wheels, J and H, and rack, K, substantially as described.
Sixth, We also claim the combination of the spring, R, rack, K, and frame, B, substantially as and for the purpose set forth.

43,494.—Hoop Lock for Casks.—Thomas Hanvey, Elma, N. Y.:

I claim the above-described hooplocks, consisting of the lock casting, A, wooden hoop, B, and wedge, C, when constructed substantially as and for the purposes set forth.

43,495.—Clasp for Hoop Locks.—Thomas Hanvey, Elma, N. Y.:

I claim, as an improved article of manufacture, a hoop clasp made of maleable iron, substantially as herein described.

43,496.—Washing Machine.—Giles M. Harris, Conesus Center, N. Y.:

I claim the bearings, f f f, in combination with the rubber, D, and bed, C, so arranged that the said rubber may be adjusted to, or further from, said bed, substantially as herein described.
I also claim the strips, i i, in combination with the bottom, B, rubber, D, and bed, C, and arranged in such a manner as to support the clothes, c, that are being washed, above the bottom of the receptacle to keep them free from dirt, and to direct the water to the center of the clothes, substantially as herein set forth.
I also claim the bearings, f f, strips, i i, rubber and bed, D C, inclined bottom, B, and boards, H H′, the whole arranged, combined, and operating substantially as herein specified.

43,497.—Percussion-cap Box.—Thomas Harvey, Baltimore, Md.:

I claim the employment of an annular cap-holder freely moveable within a circular or cylindrical case, and provided on its interior surface with teeth, so as to be operated or revolved by an interior pinion, substantially in the manner shown and described.

43,498.—Cooling-tub for Water and Beer.—Anthony Hanstetter Philadelphia, Pa.:

I claim the combination of the tub, A, the jar, c, and the circular plate, f, constructed and arranged substantially in the manner and for the purpose specified.

43,499.—Portable Water-closet.—Enoch Hidden, New York City:

I claim, first, Providing a portable water-closet, having a sealing cover, with a hinged seat, substantially as described.
Second, The combination with a portable water-closet of an extensible jointed fastening, which will admit of the seat being adjusted and also removed at pleasure, substantially as described.
Third, The combination of the locking lever with a portable water-closet, substantially as and for the purpose described.
Fourth, The arrangement of a handle, C, or its equivalent, with the cover of a water-closet having a hinged or adjustable annular seat above it, substantially as described.
Fifth, The vessel, A, which has its interior surface covered with enamel or other non-corrosive substance, and has a hinged sealing cover in combination with an adjustable seat, the whole constituting a portable water-closet, substantially as set forth.

43,500.—Harrow-teeth.—Eben N. Higley, Lake Village, N. H.:

I claim making harrow-teeth in sets of two or more teeth attached to the same stock, and pivoting the said stock to the harrow-frame, substantially as and for the purpose herein specified.
I also claim the webs, a a, on the harrow-teeth, for strengthening them, arranged substantially as set forth.

43,501.—Lock.—George Hopson, Bridgeport, Conn.:

First, I claim, in combination with the shaft, B, and guard wheels, D, of a dial-lock, the spurs, C′ and C″, or either of them, so arranged as to rotate the tumblers thereby, and to retreat or sink into the shaft, substantially in the manner and for the purpose above specified.
Second, I claim the arrangement of the tube, K, relatively to the shaft, B, head, B3, and guard wheels, D, or their respective equivalents, as herein specified.
Third, I claim the series of guard wheels, D, with the differing notches, d1 d2, and the pins, O, arranged relatively to the shaft, B, and spurs, C1 C2, so as to operate in the manner substantially as herein specified.
Fourth, I claim, in a dial-lock, the within-described arrangement and form of the pins, O, whereby their working faces, on opposite sides of a guard wheel, D, lie in one and the same plane, for the purpose herein specified.
Fifth, I claim, in combination with the bolt, G, and shaft, B, of a dial-lock, the guard bar, I, arranged to strike against the tube, K, or an equivalent moving stop, arranged and operated substantially in the manner and for the purpose herein set forth.

43,502.—Pump.—Benjamin J. C. Howe, Syracuse, N. Y.:

I claim the valve, d, and apertures, c′ c′, as described.
I also claim the combinations of the valves, h h, and lever, m, in combination with a pump having a hollow piston rod, w, valve, d, ports, c c c c, piston, b, rod, a, as shown and described.

43,503.—Window-shade Fixture.—F. J. B. Hubert, New York City:

I claim the rack-bar, C, provided with the pulley, E, and the rack, c, the latter having its teeth curved, forming parts of arcs of circles, in combination with the inclined wheel, D, having a coil or volute thread, d, on its face, to gear into the rack, c, all arranged and applied to the plate, A, and bar, B, substantially as and for the purpose herein set forth.

[This invention relates to a new and improved means for adjusting the lever-pulley over which the roller-cord of the shade passes, whereby said cord may always be kept in a proper state of tension, to ensure the turning of the roller in order to raise and lower the shade.]

43,504.—Safety Escutcheon for Locks.—Henry Hungerford, Brooklyn, N. Y.:

I claim supporting and confining the movable blotting-plate, A, on the outer surface of the scutcheon-plate by means of the guides and grooves, b b, and thumb-screw, D, or its equivalent, all as set forth.

43,505.—Brick Machine.—Freeman Jacobie, Albany, N. Y.:

First, I claim the intermediate chamber, B′, forming a vertical continuation of the horizontal or nearly horizontal chamber, B, and also communicating with the press-box, D, substantially in the manner and for the purpose described.
Second, The combination of the rotary discharger, C′ e e′, or its equivalent, with the intermediate chamber, B′, substantially as and for the purpose herein set forth.
Third, The combination of the three boxes or chambers, B B′ and D, communicating with each other, with the conveyer, C, and revolving discharger, C′, all constructed and operating substantially as and for the purpose set forth.
Fourth, The adjustable hinged table, F, arranged beneath the press-box, D, and clay-box, B′, substantially as and for the purpose set forth.
Fifth, The combination of the reciprocating follower, G, a platform, F, and press-box, D, constructed and operating substantially as described.

43,506.—Arsenical Soap.—Harry Jennings, Boston, Mass.:

I claim a combination of whale-oil soap, or other suitable soap, and arsenious acid, mixed in such proportions as to adapt the compound for the destruction or removal of vermin or impurities upon the skins of living animals.

[This invention consists in a composition of whale-oil soap and arsenical acid mixed together, with or without some coloring matter, such as venetian red, in such a manner that a soap is produced which can be used with advantage for the destruction of fleas and other parasitic insects which infect living animals, and that this soap when mixed with coloring matter can be readily distinguished from ordinary soap.]

43,507.—Amalgamating Barrels.—James B. Johnson, San Francisco, Cal.:

I claim, forming the outer shell of the amalgamating barrel or cylinder in several longitudinal sections, so that they may be easily taken apart and relined, substantially as and for the purpose described.

43,508.—Washing Machine.—H. P. Jorns, Davenport, Iowa:

I claim a dasher, C, for a washing-machine, which is constructed with a regularly stepped and concave surface, in contradistinction to a flat fluted surface, substantially as described.

43,509.—Apparatus for clarifying Cane-juice.—W. A. Jordan, New Orleans, La.:

First, I claim the combination together of the stove, water-tank, purifying-box, and juice-clarifying receptacle, in the manner and for the purpose herein shown and described.
Second, Passing the gas successively into a rain of water and a rain of cane juice, substantially in the manner and for the purpose herein shown and described.
Third, The employment of the spherically-shaped perforated covers, F J, to produce said rains, substantially in the manner herein shown and described.
Fourth, The combination of the waste-pipe, I, when constructed and operating as shown, with the water-box, E, as and for the purpose set forth.

[Without an engraving it would be difficult to describe the invention more fully than the claims set it forth. The improvement appears to be one of value. Its object is to clarify the juice in a better, quicker and cheaper manner than heretofore; and in these points it appears to possess the elements necessary to success.

43,510.—Planing the Rim-bases of Guns.—Edward Kaylor, Pittsburgh, Pa.:

I claim the mode herein-before described planing irregular curved metallic surfaces by means of a revolving chuck, furnished with one or more cutters capable of adjustment in a straight line towards or from the center of the chuck, and whose cutting-points are caused automatically to move parallel to that portion of the curved surface which it is intended they shall plane, that is to say, towards or from the axis of said body, by means of curved grooves which actuate the chuck arbor, through the instrumentality of the guide-pins adjusted therein, or their equivalents, substantially as described.
The use of the grooved barrel, guide-pin or pins and adjustable bearer in combination with the revolving cutter, shaft and chuck, for the purpose of communicating the required curved motion to the planer or cutting tool or tools, so as to plane the rim-bases of guns and other irregular curved metallic surfaces, substantially as hereinbefore described.
Also the mode of planing around the "sight" masses and lock masses of guns, by giving to the gun an oscillating motion on front of a non-revolving cutter susceptible of motion to and from the gun by means of the trunion shaft, v, fitman, w, and crank shaft, y, or their equivalents, in combination with the cutter-shaft susceptible of automatic horizontal motion, substantially as described.

43,511.—Scale-beam.—Joel F. Keeler, Pittsburgh, Va.:

First, I claim the wrought-iron weighing-lever, constructed as described.
Second, The combined main pivots when made as described.
Third, I claim the construction of the main pivot-holder, m h, with the arrangement of the pivots therein, substantially as shown.

43,512.—Turning-lathe.—Folbert Kirst, Westfield, Mass. Antedated July 6, 1864:

I claim the adjustable center, i, in combination with the jaws, a a′ a″, and set screws, m, when used for the purpose and in the manner herein described, and forming a part of a chuck for a turning-lathe.

43,513.—Churn.—Patrick Killon, Mount Healthy, Ohio:

I claim making the dasher in two parts, B B, with a separate rod, 3 3, to each, inclosed by the loose ring, c, so that the two parts may be operated separately, in the manner described, or united and operated as a single dasher, for the purpose herein set forth.

43,514.—Feeding Device for Sewing Machines.—W. A. Mack, Cleveland, Ohio:

I claim the slides, E F, and cap, H, in combination with the lever, D, and rimmed wheel, C, when arranged and operating conjointly as and for the purpose set forth.

43,515.—Roller Press for finishing Photographs, &c.—David Marshall, Pittsburg, Pa., and Benjamin Marshall, Mariette, Ohio:

I claim, first, The use of a machine for finishing photographic pictures consisting of the combination of an upper roll and a lower roll or segment of a hollow cylinder so constructed as to be easily heated by the flame of a lamp or otherwise, substantially as for the purposes hereinbefore described.
Second, Making either or both of the rolls in machines for finishing photographs slightly higher or of greater diameter at the edges than in the middle, so as to prevent the polished face of the lower roll being struck by the upper roll when the card is discharged, substantially as described.
Third, Chamfering down the edges of the body of the segment roll, so as to allow of the easy insertion of the photographic picture between the rolls, substantially as described.

43,516.—Process for preserving Meats.—W. C. Marshall, New York City:

I claim, first, Exposing the meat to be preserved, previous to putting it up in packages, to a heavy pressure, substantially as and for the purpose herein specified.
Second, The press box, C, with its movable screw-top, D, follower, G, and hinged end, I, constructed and operating substantially as and for the purpose herein shown and described.

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Third, The frame, L, applied in combination with the package, K, and press-box, C, in the manner and for the purpose substantially as herein set forth.

43,517.—Water Elevator.—Wm. Meigs, Waynesville, Ohio:

I claim the curved bar, I, attached to the bucket, J, by a pivot, d, provided at its lower end with a valve, f, and having a pulley, H, attached to its upper end, underneath which the rope, F, passes; all being arranged substantially as shown to cause the valve, f, to cover and close, under the gravity of the bucket and its contents, the discharge spout, K, of the bucket at the latter is elevated, and also to cause the valve, f, to open under the gravity of the bar, I, when the bucket, J, is suspended or held up free from the rope, F, as set forth.

I (also claim the pins, g g, attached to the bucket, J, the notches, h h, in the guides, L L, and the adjustable inclined planes, N N, attached to the latter, to operate substantially as and for the purpose specified.

I further claim in connection with the well curb, provided with a rising and falling bucket, a windlass having its drum arranged so as to slide longitudinally on its shaft while rotating with the latter, and by the means substantially as herein described, keeping the bucket rope, f, in line with the fixed pulley, G, as set forth.

43,518.—Grinding Edge Tools.—L. D. McLelland, McGregor, Iowa:

I claim, first, The employment or use of the forked lever with its point fulcrum in combination with the cross-bar and clamp, for the purpose set forth as described.

Second, The adjustable cross-bar with its clamps, for the purpose set forth as described.

43,519.—Grain Shovel.—B. E. Miles, Washington, Ill.:

I olaim a grain shovel provided with a top or cover, substantially as and for the purpose herein set forth.

43,520.—Meat-mincing Machine.—Purches Miles, New York City:

I claim, first, A straight range of fingers or beaters on a revolving shaft in combination with stationary cutters and with a spiral wing to feed the meat to the cutters, whereby the delivery of the meat from the machine is dependent upon the introduction of additional material to be cut, as set forth.

Second, I claim a series of stationary knives formed with curved cutting edges as set forth, in combination with a series of fingers passing between such cutters, whereby the meat is separated with a drawing cut, as specified.

Third, I claim a perforated detainer applied to a meat-mincer, substantially as specified to retain the meat until properly comminuted, as set forth.

43,521.—Bolt-heading Machine.—James Minter, Worcester, Mass.:

I claim, first, Making the heads of the bolts by the squeezing action of heading dies, G G′ G* G′* H*, operating substantially as herein described.

Second, The heading dies, G G′ G* G′* H*, arranged in combination with each other and with the screws, d g d* g*, substantially as herein specified, so that said dies can be readily adjusted to suit heads of different sizes.

Third, The spring dogs, f f′ f* f′* g*, carriages, I I′ I* I′* M, with shoulders, i i*, and dies, G G′ G* G′* M*, in combination with the K-shaped piece, K, or its equivalent and with the foot lever, L, constructed and operating in the manner and for the purpose substantially as herein shown and described.

Fourth, The spring rod, j*, in combination with the elbow lever, N, dog, g*, vertical heading die, H*, and foot lever, L, constructed substantially as herein specified so that the dogs of the horizontal heading dies are allowed to drop into gear in advance of the dog g*.

Fifth, The combination of the elastic plate, p, with the dog, g*, journal box, o, and vertical heading die, H*, constructed and operating as and for the purpose set forth.

Sixth, The hinged lever, Q, and cam, P, in combination with the foot lever, L, and with the dogs action upon the heading dies arranged substantially as herein specified, so that the dogs are not allowed to act upon the heading dies until the cam. P, and with it the several working parts of the machine have reached the desired position.

Seventh, The combination of the swivel arm, W, with the hand lever, R, and movable jaw, Q′, constructed and operating substantially as and for the purpose shown and described.

43,522.—Propeller.—O. C. Phelps, New York City:

I claim, first, The employment or use in stern propellers for vessels, of an iron frame-work, arranged so as to support the rear end of the propeller shaft, and admit of the lateral movement of the same, substantially as described.

Second, Connecting the steering chains with the rear end of the propeller shaft, substantially as set forth.

Third, The shaft or stern, K, when used in combination and connected with the propeller shaft, G, substantially as and for the purpose specified.

43,523.—Rock Drill.—John Phillips & Albert Tschop, Siddonsburg, Pa.:

We claim, first, The adjustable frame, A, in combination with the adjustable prop or support, C, constructed and arranged as shown and described for the purpose of regulating the position of the frame, A, and drill, R, to bore or drill in a vertical or in a more or less inclined position, as set forth.

Second, The combination of the endless belts, H, provided with the projection, m, the collar, r, on the drill-shaft, Q, the screw, O, on shaft, N, and the warm wheel, P, on shaft, Q, all arranged in the sliding frame, E, to operate as and for the purpose herein set forth.

Third, The strap, F, attached to the sliding frame, E, and fitted in a clamp, j, on the frame, A, in combination with the collar, u, on the shaft, Q, arranged in relation with the lower cross-piece, t, of the frame, E, to operate as and for the purpose set forth.

Fourth, The rack, M, on the frame, E, in combination with the adjustable or sliding pinion, o, on the shaft, K, for the purpose of elevating the frame, E, as set forth

43,524.—Pianoforte Action.—Frederick Pistorias, Chicago, Ill.:

I claim, first, Adapting the action of a "square" or "square grand" pianoforte, by means substantially as described, to operate with the hammer or hammers, squarely and simultaneously upon the strings and produce a vertical, uniform and simultaneous vibration thereof; and while this is the result the hammer action may be at different angles to the keys and upon bearings independent thereof, substantially as set forth

Second, So adapting the action of a square pianoforte and the support thereof, that the keys, i, may be applied indirectly to the action in such manner that the entire key-board or any one or more of the keys may be readily removed and replaced at pleasure, without disturbing the action, or the action removed without disturbing the keys, substantially in the manner described.

Third, Adapting the hammer or the damper movements to operate in conjunction with counter keys, b, and independent removable keys, i, substantially as described.

Fourth, The adaptation of counter keys, b, independent removable keys, i, and independent frame, C, for application to a square piano, in the manner substantially as described and for the purpose set forth.

Fifth, The horizontal and independent action supporting frame, C, when constructed so as to be adapted for use with a square piano, in combination with the removable key-board, G, substantially as and for the purpose set forth.

Sixth, The arrangement of the hammers, a′, in such relation to an independent action, and the strings of a square pianoforte, that said hammers operate squarely and simultaneously upon the strings and produce a vertical and simultaneous vibration of all the strings of each hammer that is acted upon, substantially as described.

Seventh, The arrangement of the adjustable pads, j, with the independent action, for the purpose of regulating the amount of movement of the jacks upon the hammer butts, in the manner described.

Eighth, Arranging the damper crank or lever, H, upon frame, C′, directly over and parallel to the counter-key, b, substantially as described.

Ninth, Applying the hammer check, c, to the hammer ruler or back rail, E, and operating said check partly by the counter, k b, and partly by its own gravity, substantially as described.

Tenth, Adapting the action of a "square" or "square grand" pianoforte, to operate when arranged at different angles to the keys and upon bearings independent thereof, substantially in the manner herein described.

43,525.—Harvester.—J. R. Pressey, Dubuque county, Iowa, M. A. Wheaton, Suisun City, Cal., and David Sheets, Pike county, Mo.:

We claim the combination of the wheel, D, toothed rim, F′, lever, J′, rollers, E′ E′, guides, g g, secondary lever, j, connecting rods, i i, and sickle, I′, all constructed, arranged and operating in the manner and for the purposes herein specified.

[This invention consists, first, in an improved means for operating or driving the sickle of the reaper or mower; second, in an improvement in the draught mechanism, and third, in an improvement pertaining to the grain or grass wheel, the manner of adapting the same to the machine. The object of the invention is to obtain a means by which the sickle may be operated with less friction than ulual, and the machine rendered capable of being turned with greater facility, and one in which the draught will be materially diminished.]

43,526.—Pocket Tobacco Pipe.—Philip C. Rowe, Boston, Mass.:

I claim a tobacco pipe constructed with double walls to form two chambers communicating with each other by means of one or more perforations, c′ c′, in combination with a draught tube, C, a stem, D, and an opening or collar provider with a plug or stopper, F, all arranged substantially as herein set forth.

[This invention relates to a new and improved tobacco-pipe, designed to be carried in the pocket while in use or while being smoked. The invention consists in constructing the bowl of the pipe with double walls, and having the chamber formed by said walls communicate with the tobacco chamber by means of perforations. The stem of the pipe is a flexible tube which communicates with the chamber formed by the double walls, and a flexible bent tube is attached to the cover of the bowl; whereby an extremely portable device is obtained, and one which may be used or smoked with far less inconvenience or embarrassment than the ordinary pipes in use.]

43,527.—Manufacture of a Bi-basic Soap.—Daniel Shattuck & Clinton K. Daniels, Chicago, Ill.:

We claim the manufacture of a bi-basic soap, composed of corn-meal, and animal oils or grease, by the process herein described.

43,528.—Washing Machine.—D. H. Thearer, Drakesville, Iowa:

I claim, in combination with the two oscillating rubbers, F G, the dirt chamber, B, arranged within the suds-box, A, substantially as and for the purpose set forth.

[This invention consists in the employment of two oscillating rubbers placed within a suds-box provided with a dirt chamber, whereby clothes may be washed and thoroughly cleansed.]

43,529.—Cartridge Retractor for Revolving Fire-arms.—R. D. O. Smith, Washington, D. C.:

I claim, first, In combination with an automic device for removing the shell of an exploded metalic cartridge from its chamber in the cylinder, a device by means of which said automic device may be prevented from operating when it is not desirable that it should operate.

Second, In combination with the hammer of the lock of a revolving fire-arm, the cam o, bolt, K, and spring, S, substautially as described and for the purpose set forth.

Third, In combination with the bolt, K, the channel, M, substantially as described and for the purpose set forth.

Fourth, In combination with the cam, O, the lever, u, and plates w, substantially as described and for the purpose set forth.

Fifth, In combination with the cylinder of a revolving fire-arm, a device to cause the said cylinder to revolve one stage during the first half of the motion of the hammer from "rest" to "full cock."

43,530.—Machine for drying Wool.—P. Stillman, Westerly, R. I.:

I claim, first, The construction of a wool-dryer, the wool-holding box of which is square or of other form substntially the same, the perforated bed being of an area whose length and breatth are of equal dimensions, in combination with a fan, and the air chamber the sides of which are tapering at equal inclinations from the borders of the box toward the center, substantially as herein set forth.

Second, The employment, in combination with the perforated bed of wool-dryers, of a fan, the axis of revolution of which is at right angles to the bed, substantially as set forth.

Third, The combination with a central pan situate in a horizontal plane of a bed of a square, or equivalently the same area, arranged in a plane parallel to the fan, so that the blast may be diffused equally, or nearly so, over the whole surface of the bed, or substantially as set forth.

Fourth, The combination of square bed, or bed substantially the same, with an air chamber, the sides of which converge from the said bed towards a fan case, and central fan revolving upon a vertical spindle, the whole being arranged for operation in the manner and for the purpose described.

43,531.—Raking Attachment to Harvesters.—Henry K. Taylor, Racine, Wisconsin:

I claim the rake, D, attached to the framing, A, by means of the universal joint, b, in connection with the rod, E, lever, F, pitman, G, crank, H, and the chain K, all being arranged to operate in the manner substantially as and for the purposes herein set forth.

[This invention relates to an improved self-raking attachment for harvesters, and it consists in the employment of a vibrating rake operated through the medium of a crank and pitman, in connection with a lever, connecting rod and chain, all arranged in such a manner that a reciprocating movement is not only given the rake, but also a rising and falling one, and the rake made to perform its work in a very efficient manner.]

43,532.—Washing Machine.—J. R. Yerbill, Chicago, Illinois:

I claim, first, The combination and relative arrangement of the toothed ring, D, with loops, a a, on it for receiving lever, E, pinion wheel, D, and the upper bearing, C, for this pinion, as shown and described.

Second, The toothed bevel wheel or ring, D, cast with loops, a a, on it in combination with the removable lever, E, pinion, D, collar bearing, C, and vertical rubber shaft, carrying a horizontal rubber, G, all arranged and operating substantially as described.

43,533.—Blind and Shutter Fastening.—Daniel E. True, Leominster, Mass.:

I claim the combination and arrangement of the toothed sector, G, and rack, F, with the slotted plate, D, of the blind with the stud, c, of the arm, E, combined with an operating lever or arm, H, as specified.

And in combination with the arm, H, and its arm, E, applied to the blind, I claim the two sectors, I L, the locking crank and the whole hung to operate as specified.

43,534.—Treating Feldspar to obtain Useful Products.—George E. Vanderburgh, Mamaronec, N. Y.:

I claim a new and useful composition of matter produced by submitting felspar to substantially the treatment herein described.

43,535.—Amalgamator.—Thomas Varney, San Francisco, Cal.:

I claim, first, The method of fastening the shoes to the upper muller by casting the rivets into the shoes, as shown.

Second, The use of the flanges on the lower edges of the curved places, in the manner and for the purposes set forth.

Third, The employment of the space for the quicksilver about the periphery of the mullers, with no openings therefrom in the lower muller by which the quicksilver is prevented from being ground, and at the same time is so situated that it is brought into constant and effective contact with the pulp.

Fourth, The use of the slots in the lower muller filled with wood or its equivalent, for the purposes set forih.

Fifth, The mode of suspending and driving the upper muller by the arms, u, and ring, h, and flange, v, with its projections.

43,536.—Inhalator.—Maurice Vergnes, New York City. Patented in England, and France May 10, 1864:

I claim the use and construction of a box to contain medicated powder for respiration, with a revolving fan for mixing them wit the air to be breathed, in the manner substantially as above described-

48,537.—Apple-parer.—John Voak, Penn Yan, N. Y.:

I claim the sliding bar, C, with the circular projection, a, or its equivalent, when made and actuated substantially as specified and used for the purpose set forth.

43,538.—Folding Table.—Joseph W. Wayne and Joseph R. Miller, Cincinnati, Ohio:

We claim the double folding table, constructing and operating in the manner herein represented and described, and for the purposes specified.

43,539.—Cartridge Boxes.—Horace S. Weston, Akron, Ohio:

I claim, first. The herein-described construction of cartridge boxes provided wite a series of smooth or serrated cutters, as arranged that the folded end to be torn preparatory to charging the gun are first unfolded and thrust through, or between, or under, the edge of the knife, A, and secured firmly in place by the slider, C, and springs, D, D, as herein set forth.

Second, I claim the slide, C, in combination with a series of knives A, and springs, D D, when arranged and operating as and for the purpose described.

43,540.—Whip Socket.—A. M. Whipple, North Adams, Mass.:

I claim tue employment or use for the purpose of fastening whip sockets, of a bolt, a, in combination with the bevelled block, C, applied and operating substantially as and for the purpose set forth.

[This invention relates to a new and superior method of attaching whip sockets to the dash-board or other parts of carriages or other vehicles.]

43,541.—Pulley Block.—N. C. Whitcomb and Wm. Paddock, Oak Hill, N. Y.:

I claim the pulley block, constructed as herein represented and described.

43,542.—Farm Fence.—E. W. Woodruff. Washington, D. C.:

I claim, first, So forming the upper ends of the posts, by means of a dovetail shape, and a corresponding angularity of the rails, that when the wires forming the body of the fence are drawn to their required tension, the said rails are held firmly in place.

Second, I claim attaching the wires to the posts, and supporting the same on intervening posts, in the manner described, in combination with the method of giving tension to the wires, substantially as specified.

43,543.—Field Fence.—Wm. J. Young, Le Roy, N. Y.:

I claim the combination of a double row of fixed posts, in alternating series with interlocking panels arranged to the posts, substantially in the manner and for operation as herein set forth.

43,544.—Joint Clip and Spoke Socket for Wheel Vehicles.—Henry Bailey, assignor to G. D. Brown, Pittsford, N. Y.:

I claim the combined joint-clip and spoke socket, when the cylindrical tenon, B, of the spoke is made to reach through the felloe, and the shoulder, to rest upon the edge of the projecting collar or socket, r, all being constructed and arranged in the manner and for the purposes set forth.

43,545.—Arithmetical Frame.—H. K. Bugbee, assignor to American School Apparatus Company, New York City. Antedated July 7th, 1864:

I claim a frame containing a series of horizontal slats, revolving vertically, and provided with figures on one or both sides so arranged as to form columns of figures, the whole being constructed substantially as and for the purposes herein set forth, and forming a new article of manufacture.

43,546.—Attaching Reels to Fishing Rods.—Thomas W. Cummings (assignor to J. Littledale), New York City:

I claim the attaching of rests to fishing rods or poles, by means of a bolt and a hook or its equivalent, substantially as herein shown and described.

[The object of this invention is to obtain a means whereby reels may be attached to and detached from fishing rods or poles, with greater facility than by the band fastening now employed.]

43,547.—Mode of treating Wool for removal of Burrs, etc.—James Fuller (assignor to Margaret V. Fuller), Yonkers, N. Y.:

I claim the treating of the wool with the two acid solutions, of different densities, substantially as hereinbefore specified, preparatory to its being subjected to the compound solution of soda, ash, and Irish moss,

I also claim the employment of the picker, at the final stage of the process, or after the wool, with the burrs in it, may have been otherwise treated, as hereinbefore explained.

43,548.—Fire-proof Composition for Crucibles, etc.—L. Held (assignor to Geo. P. Schiffilin), New York City:

I claim, first, The use of carbon puriged, as above described, and mixed with clay in about the proportion herein set forth, and then exposed to a bright red heat pulverized, substantially in the manner and for the purpose specified.

Second, The composition obtained by mixing together the ingredients above specified, in about the proportion and and substantially in the manner and for the purpose herein set forth.

43,549.—Improvement in Cart.—Barton Bicketson, of New Bedford, Pa., and A. B, Smith, of Clinton, Pa. assignors to said Barton Ricketson:

We claim the combination and arrangement of the bent axle, B, the thills, D and D, attached to the verticrl portions of said axle, and the cast body, C, turning on the low portion of the axle within the thills, substantially as and for the purposes herein specified.

We also claim controlling the tail-board, so as to open and close the same automatically, by connecting its fastenings with the bent axle, so as to be operated thereby, in the act of dumping the cart substantially as herein specified.

Third, In combination with the self-acting tail-board, as set forth, we also claim the removeable portion, L, and securing cord, u u, as described.

43,550.—Machine for filling Cartridges.—J. G. Stowe and E. F. Allen (assignors to Burnside Rifle Company), Providence, R. I.:

We claim, first, A charger having cut off and delivery slides, k k, controlling a series of charging chambers, operated in the manner substantially as described for the purposes specified.

Second, The mode of operation substantially as specified, by means of which the delivery slide of the charging apparatus is alternately locked and tripped for the purposes specified.

Third, The mode of operation, substantially as specified, by means of which the movement of the carriage, B, and of the cut off and dellvery slide of the charger, K, is arrested at any determined point in the progreis of the carriage for the purposes set forth.

Fourth, The combination of the stops, s s, with the spring catches, q q, substantially as described for the purposes specified.

43,551.—Driving Mechanism for Sewing Machines, etc.—Turner Williams (assignor to himself and David Heaton), Providence, R. I.:

I claim the arrangement of the auxilary pins, h h, the rocking lever, k, and crank pin d, as described in combination with a pair of curved connecting rods or their equivalent, and a treadle constructed in two parts, as described, the whole operating substantially as specified.

43,552,—Composition for lining Oil Barrels.—W. Williamson, assignor to himself and Geo. W. N. Yost, Goldsborough, Pa.:

I claim the use of prepared petroleum tar, coal tar, or pine tar, for lining crude petroleum oil barrels or vessels to prevent them from leaking.

43,553.—Breech-loading Ordnance.—L. W. Broadwell, London, England, assignor to W. I. Townsend, New York City:

I claim the construction of the expanding ring, n, with the projection, p, and flange, r, in combination with the under-cut bearing, k, substantially as and for the purposes herein specified.

I also claim the combination of a perforation, B, in the sliding block, A, of an opening in the breech of the gun, or their equivalents, for admitting, and an aperture, s, in a line with the bore, for driving in the cartridge, substantially as herein described.

43,554.—Heating Sad-irons.—Auguste Francois Dusantoy, Neuilly (Seine), France, assignor to Moritz Pinner, New York City. Patented in France, April 13, 1864:

I claim the construction of a smoothing-iron, which is heated within the iron itself by a combined jet of lighting or heating gas

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and air, or its equivalent, and acting in the manner of a blow-pipe, substantially as herein set forth and described.

43,455.—Process of treating Maize, Barley and other Cereals for the Manufacture of Alcohol, etc.—Alois Fleischman, Olmutz, Movaria, Austria. Patented in Austria, June 14, 1862:

I claim the use of sulphurous acid gas water, in the process herein-before described, for preparing indian corn, rye, wheat, barley, and other cereals, for the manufacture of alcohol and other spiritous liquors by distillation.

43,456.—Devices for supplying Weft to the Shuttles in Looms.—Thomas Ingraham, Bradford, England:

I claim, first, The combination of the lever, D, with the weft fork, E, and the tappet, F, substantially as and for the purpose set forth.

Second, The combination of the lever, L, with the weft fork, E, and the shaft, M, substantially as and for the purpose set forth.

Third, The combination of the lever, N, with the shaft, M, and the pin, n, substantially as and for the purpose set forth.

Fourth, The combination of the lever, J, with the propeller, I, the pin, n, and the spring, K, substantially as and for the purpose set forth.

Fifth, The combination of the clamps, H, with the hopper, G, with propeller, I, and the shuttle-boxes of the lay or batten, O, substantially as and for the purpose set forth.

Sixth, The combination of the tongue, P, with the pin, n, the lever, N, and the lever, J, substantially as and for the purpose set forth.

Seventh, The combination of the lever, S, with the tumbler, R, and the shuttle-boxes of the batten, O, substantially as and for the set forth

43,557.—Mode of coating and bronzing Metals.—Fred. Weil, Paris, France. Patented in France, Dec. 11, 1863:

I claim the process herein described for metal-coating bronzing and coloring metallic articles by immersing them in an alkaline solution, containing a salt of the metal which is to form the coat, and containing tartaric acid, or any organic matter preventing the precipitation of oxyde of said metal, when such solution is used with or without the introduction of zinc, and with or without the addition of cyanide of sodium, or their equivalents.

RE-ISSUES.

1,724.—Artificial Leg.—Douglas Bly, Rochester, N. Y. Patented May 17, 1859 (No.24,002):

I claim curving or deflecting the jointed extremities of the bars, J, so as to bring their axis-of-motion back of their line of direction, substantially as and for the purposes set forth.

I claim the cord, T, and spring, P, acting upon the parts, D and L, substantially in the manner and for the purpose herein set forth.

I claim the combination of the india-rubber spring, E, with a tendon or cord, in such a manner that the required effect is derived from the compression and expansion of the material, and not from its elongations and contractions, substantially as set forth.

I also claim placing the spring of caoutchouc, or equivalent material, which acts from the compression of its mass, in a chamber or cavity, which has such a size or diameter in relation to that of the springs as to regulate and check the compression of the spring, at the required limit of the motion of the limb, and protects the spring from overaction.

I claim the axial bolts or transverse axis, B C, as and for the purpose herein set forth.

I claim providing the ends of cords, F, with the enlargements and with the conical socket fastenings, G, to receive the same, substantially as described, in order to apply adjusting screws, for the purposes herein specified.

I claim the manner of constructing the bearing portions of the knee-joint, consisting of the upper and lower bearing blocks, N N, each of which forms a segment of a cylinder more or less corresponding with the axial bolt, the one being fixed in position and the other adjustable by means of the screws, S S, to admit of adjusting the parts together, to prevent looseness and noise, and to reduce and regulate the friction, substantially as and for the purpose herein set forth.

1,725.—Lock.—Martin Briggs, Rochester, N. Y.. assignee of H. W. Covert. Patented Sept. 15th, 1857:

I claim the plane or corrugated center, h, as described, in combination with the ring or rim, g, the whole arranged in the manner and operating as herein specified.

In combination with a set of permutation wheels, H H, I also claim the stationary washers, n n, operating substantially in the manner and for the purpose herein specified.

In combination with a set of permutation wheels, H H, and stationary intermediate washers, n n, I also claim the inclosing box, I, substantially as described.

1,726.—Drawing Regulator for Spinning Machines.—E. D. & George Draper, Milford, Mass., assignees by mesne-assignments of Newell Wyllys. Patented Jan. 28, 1851:

We claim the combination of the escapement mechanism or its mechanical equivalent, with the trumpet, M, the counter-weight, W, or its equivalent and mechanism, substantially as described, for revolving the screw, e, of the belt-shipper and of the mechanisms by which the sets of drawing rollers are revolved, the said escapement mechanism being connected with the trumpet and applied to the gear, S, and consisting of the disk, t, the pawls, a b, the lever, y, and its operative mechanism, substantially as herein-before explained.

And we also claim as the invention of the said Wyllys, the arrangement of the trumpet-arm, E, as herein described, in connection with the system of weighted levers, the escapement, the belt-shifting mechanism, the reversed cone pulleys and the mechanism operated by them, whereby the force required to move the trumpet is made to vary under different circumstances to a sufficient extent to prevent over-sensitiveness in the mechanism which changes the relative speed of the drawing rolls to inequalities in the slivers, while, at the same time but little force is required to effect such changes, thus proportioning the draw more nearly than heretofore to the quantity of fiber in the sliver, and thereby rendering the latter of more uniform diameter and density.

1,727.—Spoon and Fork.—Florian Grosjean, New York City. Patented Jan. 28, 1862:.

I claim stamping or swaging spoons or forks from pieces of sheet metal, with middle longitudinal corrugations or ridges extending along the narrow or weaker part of the handle and prolonged into the bowl thereof, so as to give proper strength and finish to the junction of the handle and bowl, either leaving the flat around the corrugation or forming a bead therein, substantially as and for the purposes herein specified.

1,729.—Apparatus for cutting Button-holes.—Frederick C. Leypoldt, Philadelphia, Pa. Patented December 18, 1860:

I claim an instrument for cutting button-holes, wherein the cutter, B, is actuated by the described combination of lever, A and C, when these levers are jointed and otherwise arranged, substantially as and for the purpose set forth.

DESIGNS.

1,968.—Stove.—Garrettson, Smith and Henry Brown, Philadelphia, Pa., assignor to J. H. Haywood, D. L. Bartlett, and H. W. Robbins.

1,969.— Trade-mark.— Henry Damon, Boston, Mass. Antedated June 7, 1864.

1,970.—Doors of a Stove.—Giles F. Filley, St. Louis, Mo.

Back Numbers and Volumes of the "Scientific American."

VOLUMES III., IV., VII., IX AND X., (NEW SE- complete (bound) may be had at this office and from periodi- Price, bound, $2 25 per volume, by mail, $3—which in- Every mechanic, inventor or artisan in the United a complete set of this publication for reference. uot fail to preserve their numbers for binding and VIII. are out of print and cannot be sup-

PATENTS

GRANTED

FOR SEVENTEEN YEARS!

MUNN & COMPANY,

In connection with he publication of the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *seventeen years*. Statistics show that nearly ONE-THIRD of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after *seventeen years'* experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from the three ast ex-Commissioners of Patents:—

MESSRS. MUNN & Co.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter:

MESSRS. MUNN & Co.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & Co.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D. BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar nvention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F. and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row New York.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

The Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row New York.

REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject, giving a brief history of the case, inclosing the official letters, &c.

FOREIGN PATENTS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They think they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO'S Agency, the requirements of different Government Patent Offices, &c., may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignments of patents. Fees moderate.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that they devote their whole time and energies to the interests of their clients.

COPIES OF PATENT CLAIMS.

MESSRS. MUNN & CO., having access to all the patents granted since the rebuilding of the Patent Office, after the fire of 1836, can furnish the claims of any patent granted since that date, for $1.

THE VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars address MUNN & CO., No. 37 Park Row New York.

EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort at extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention

Patents may be extended and preliminary advice obtained, by consulting or writing to MUNN & CO., No. 37 Park Row, New York.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American atent Agency, No. 37 Park Row, New York.

UNCLAIMED MODELS.

Parties sending models to this office on which they decide not to apply for Letters Patent and which they wish preserved, will please to order them returned as early as possible. We cannot engage to retain models more than one year after their receipt, owing to their vast accumulation, and our lack of storage room. Parties, therefore, who wish to preserve their models should order them returned within one year after sending them to us, to insure there obtaining them. In case an application has been made for a patent the model is in deposit at the Patent office, and cannot be withdrawn.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row, New York.

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Notes and Queries

W. H. J., of Pa.—The old system of fastening shoes to horses feet by nails is still universally practiced. Attempts have recently been made to introduce other methods, but we have still to look for the result.

J. R., of Ohio.—The weight of one cubic foot of water is 62½ pounds. The weight of one gallon is about 8 pounds. You can calculate the weight of water in your tank for yourself.

P. B., of Conn.—One square foot of wrought iron one inch thick weighs 40·6 pounds, of course if half an inch thick it weighs 20·3 pounds. You will find the information desired about water in another part of this column.

B. F. G. W., of N. Y.—Our charge for obtaining the information you desire in regard to Legare's patent will be $5. As your letter is not properly signed we cannot preserve it on our files.

G. R. B., of Pa.—We do not know of any parties engaged in making artificial leather. The best way to reach such persons is to advertise.

G. H. C., of N. J.—Nothing is more agreeable to us than to receive accounts from our institutions of learning of new discoveries in science. We see nothing novel in your battery, however, except the form, and that seems to be no improvement. The zinc cup holding the acid will be rapidly corroded, and as soon as it is eaten through, the acid will run out upon the floor. The iron too is liable at any moment to lose its passive state when it will be very quickly dissolved.

P. W., of R. I.—Every steam piston should be packed. We have seen many varieties used but none that were at all equal to the three rings as ordinarily made. Water packing has been employed but it is not efficient or economical. It is made by turning small grooves in a solid piston; the grooves are 3-16ths of an inch wide and deep. The theory is that they get filled with water from condensed steam and prevent leakage. They get filled with dirt instead and scratch the cylinder greatly.

T. W. R., of N. Y.—There must have been water in your mold, or the cores were damp. Metal will not fly out of the "gate" if proper care is taken.

M. McD., of Mass.—One 20-inch gun has already been cast, but is not yet finished, we believe.

C. R. M., of Conn.—Fusible safety plugs are not used in this country for steam boilers. They have been found inoperative. They are still employed to some extent in England, but they are regarded with suspicion, we are told.

I. P., of N. Y.—If your invention has proved to be a valuable one to the country, the fact of your having realized a small fortune from it will not militate against its extension. An inventor of a really valuable improvement is entitled to a munificient reward, and we think your case not an exception. You must make your application for the extension at least ninety days before the date of its expiration.

J. J. S., of Ky.—The machine to which you refer for making cigars was published in the SCIENTIFIC AMERICAN, Vol. I, No. 16, new series. We do not know the present address of Mr. Beanchi, the patentee.

E, M. W., of——.An artesian well is one in which the water flows up from an under seam above the surface. Such wells are generally formed in basins, where the rocky strata dip downwards, and they are supplied from distant elevations or the water would not be forced up to the surface.

J. G., of Mass.—You will find an illustrated series of articles on the manufacture of axes, in Vol. I, of our new series, beginning at page 267.

V. C., of N. J.—Stevenson's turbine yields a larger proportion of the total power of the water than any other water wheel that we know of. But turbines are not adapted to work where great changes are made in the amount of resistance, as in throwing machines into and out of gear. Stevenson's address is 200 Broadway, New York. We know of no manufactory of Barker mills.

S. W. N., of N. Y.—Nothing is better settled than that a body projected vertically upward from the earth, would fall with the same velocity that it rises were it not for the resistance of the atmosphere. It is also true that but for the resistance of the air all bodies would fall with the same velocity—a feather as rapidly as a guinea. We have seen this demonstrated repeatedly in a vacuum tube. As you desire authorities, we refer you to Newton's Principia, Definition VII. "The force of gravity (taking away, or allowing for, the resistance of the air) equally accelerates all falling bodies, whether heavy or light, great or small." See also Silliman's Philosophy, page 71.

Money Received.

At the Scientific American Office, on account of Patent Office business, from Wednesday, July 6, 1864, to Wednesday, July 13, 1864:—

J. D., of N. Y., $16; A. W. T., of Ill., $20; J. F., of N. Y., $22; J. H. C., of N. Y., $16; P. & M., of Mass., $15; L. D., of N. Y., $16; J. R. B., of N. Y., $20; O. C. P., of N. Y., $20; A. J. L., of N. J., $20; J. B. R., of N. Y., $20; E. T., of Pa., $20; G. G. P., of N. Y., $16; M. R., of N. Y., $16; L. G. K., of Mass., $20; A. M., of Ill., $25; E. C. C., of Mass., $16; S. W., of Ill., $25; McL. & G., of Pa., $16; W. H. H., of Ill., $25; A. W., of Ill., $25; G. McK., of N. Y., $20; T. G. M., of N. Y., $40; G. & G., of Pa., $16; W. S., of Ohio, $26; N. T., of N. H., $16; L. M. H., of N. Y., $15; W. R. M., of Pa., $32; A. S., of N. Y., $16; L. S., of N. Y., $20; O. C. F., of D. C., $16; G. H., of N. Y., $46; G. E. R., of N. Y., $20; E. C., of Iowa, $20; A. A. S., of Iowa, $20; S. W. H. W., of N. Y., $20; W. W., of Conn., $20; H. U., of Conn., $20; H. F., of N Y, $16; G. M., of N. Y., $10; C. B. R., of Mass., $32; E. S., of Minn., $16; S. N. T., of Wis., $26; H. N., of Pa., $21; R. W. G., of Ill., $60; E. D., of Pa., $10; G. H., of Cal., $25; T. S., of Pa. $25; D. C. A., of Iowa, $20; D. D., of Ill., $16; A. M. G., of N. H., $25; J. P. C., of N. Y., $25; E. C. G., of Cal., $100; J. R., of Mass., $25; W. G. K., of Ind., $16; O. C. McC., of Ohio, $20; E. B., of C. W., $20; J. P., of Mass., $20; T. T. B., of N. Y., $16; H. E. F., of Conn., $20; C. B. G., of Iowa, $20; E. H. L., of Pa., $45; H. T., of Wis., $20; J. P., of N. Y., $20; P. B. P., of N. Y., $20; C. H. S., of Pa., $16; S. S. G., of Mass., $28; J. A. L., of Wis., $16; L. O. C., of Pa., $36; R. P. B., of Mich., $20; H. C. S., of Ill., $16; T. W. H., of Wis., $30; E. O. F., of La., $16; C. R. H., of Wis., $25, T. & P. S., of Pa., $25; H. D., of Ohio, $16; E. L., of Ind., $16; T. S., of N. H., $41; T. R. F., of Mich., $25; P. P. J., of Ill., $16; J. W. C., of N. Y., $25; H. C., of N. Y., $27; G. H. S. D., of N. Y., $75; O. C. E., of N. Y., $25; P. L., of N. Y., $25; J. L., of N. Y., $25.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it and if they have not received an acknowledgment by mail and their initials are not to be found in this list they will please notify us immediately, stating the amount remitted, how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from Wednesday, July 6, 1864, to Wednesday, July 13, 1864:—J. F., of N. Y.; H.C., of N. Y.; G. H. S. D., of N. Y. (3 cases); O. G. B., of N. Y.; P. L., of N. Y.; J. L., of N. Y.; J. B. E., of Mo. (2 cases); F. W., of England (3 cases); D. E. B., of Ind.; J. B., of Mich.; E. S., of Pa.; N. Y., of N. J.; F. G. L., of Mass.; R. W. G., of Ill.; T. S., of N. H.; D. & B., of N. T.; C. & M., of Ohio; H. N., of Pa.; T. S., of Pa.; S. N. T., of Wis.; T. G. M., of N. Y.; R. W. G., of Ill.; J. R., of Mass.; W. S., of Ohio; T. R. F., of Mich.; G. C., of Ill.; J. P. C., of N. Y.; J. W. C., of N. Y.; A. M. G., of N. H.; L. O. C., of Pa.; B. & G., of Ill.; A. M., of Ind.; S. S. G., of Mass.; T. & P. S., of Pa.; A. W., of Ill.; J. & J. N. T., of Ind.; G. H., of Cal.; W. H. H., of Ill.; S. W., of Ill.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and enclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

MODELS are required to accompany applications for Patents under the new law, the same as formerly, except on design patents, when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgement of our reception of their funds.

Binding the "Scientific American."

It is important that all works of reference should be well bound. The SCIENTIFIC AMERICAN being the only publication in the country which records the doings of the United States Patent Office, it is preserved by a large class of its patrons, lawyers and others, for reference. Some complaints have been made that our past mode of binding in cloth is not serviceable, and a wish has been expressed that we would adopt the style of binding used on the old series, *i. e.*, heavy board sides covered with marble paper, and morocco backs and corners.

Believing that the latter style of binding will better please a large portion of our readers, we commenced on the expiration of Volume VII., to bind the sheets sent to us for the purpose in heavy board sides, covered with marble paper and leather backs and corners.

The price of binding in the above style is 75 cents. We shall be unable hereafter to furnish covers to the trade, but will be happy to receive orders for binding at the publication office, No. 37 Park Row, New York.

RATES OF ADVERTISING.

TWENTY-FIVE CENTS per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published we will explain that ten words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

FOR SALE.—ONE PULLEY, 80 INCHES DIAMETER, 24-inch face, bored for 3⅞-inch shaft. Apply to "Providence Tool Company," Providence, R. I. 4 tf

NOTICE.—PARTIES HAVING EITHER AN IMproved Thrashing Machine, Farm Mill, or Cotton Gin to be introduced, may address "Patent Horse-power Company," 1,509 Pennsylvania avenue, Philadelphia. 4 6*

MAIN AND BROWN ON THE MARINE STEAM ENGINE. Just published—

THE MARINE STEAM ENGINE. By Thomas J. Main, F.R. Ast. S., Mathematical Professor at the Royal Naval College, Portsmouth; and Thomas Brown, Assoc. Inst. C.E., Chief Engineer R. N. attached to the Royal Naval College, authors of "Questions Connected with the Marine Steam Engine," and the "Indicator and Dynamometer." With numerous Illustrations. In one volume, 8vo. Price $5, by mail, free of postage.

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INTRODUCTORY CHAPTER. Steam. Water. Caloric. Temperature. Heat and cold. General effects of heat and cold. Expansion by heat. Expansion of gases. Practical methods of observing expansion. Various applications of this principle. Law of expansion by heat not universal. Beneficial result arising from this anomaly. To show that the law fails in the foregoing case. To ascertain the temperature of any substance. Pyrometer. Thermometer. Method of graduating thermometers. To compare thermometers when differently graduated. Laws of cooling. Conduction. Conducting powers of bodies. The sensations a bad criterion of temperature. Convection. Advantages to be derived from a knowledge of this law. Explanation of some natural phenomena. Radiation. Radiating power of bodies—what it depends on. Land and sea breezes. Capacity for heat. Unit of caloric. Latent heat. Under what circumstances heat becomes latent. Heat the cause of melting and vaporizing bodies. Calorimeter. Sources of heat. Heat generated by mechanical operations. Combustion. Temperature necessary for combustion. Oxidation. Effects of galvanic action. Boiling point. Boiling point as influenced by pressure. Temperature of steam. Vapor. Formation of dew. Causes influencing the formation of dew. Vapor and steam distinguished. Method of obtaining steam. Steam distinguished from other elastic fluids. Boiling point of fresh water. Boiling point of salt water. The steam of salt water is fresh. Process of distillation. High-pressure steam. Measure of steam by atmosphere. Laws regulating the pressure of steam. Pressure, density, and temperature of steam. Specific gravity of steam. Common steam. Superheated steam. Analysis of sea-water. Saline contents of sea-water. Gaseous matter in sea-water.

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ORDNANCE OFFICE,
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WASHINGTON, D. C., July 8, 1864.

Sealed Proposals will be received at this office until Monday, the 1st day of August, 1864, for 8-inch Mortar Shell, to be delivered in the following quantities, at the undernamed arsenals, viz:—

At the Watertown Arsenal, Massachusetts, 5,000.
At the Watervliet Arsenal, New York, 10,000.
At the New York Arsenal, Governor's Island, N. Y., 20,000.
At the Alleghany Arsenal, Pittsburgh, 10,000.
At the Washington Arsenal, D. C., 5,000.

These projectiles are to be made of the kind of metal, and inspected after the rules laid down in the Ordnance Manual; the tensile strength of the iron to be not less than 14,000 lbs. per square inch.

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Bidders will state the rate at which they will deliver. Failures to make deliveries at a specified time will subject the contractor to a forfeiture of the number he may fail to deliver at that time.

Bidders will state explicitly the Arsenal, or Arsenals, where they propose to deliver, and the number of projectiles they propose to deliver at each place, if for more than one.

No bids will be considered from parties other than regular founders, or proprietors of works who are known by this Department to be capable of executing the work proposed for. Should any party obtaining a contract offer shell other than those cast in his own foundry, they will be rejected, and the contract rendered null and void.

Forms of bids can be obtained at the above-named Arsenals. Proposals not made out on this form will not be considered.

GUARANTY.

The bidder will be required to accompany his proposition with a guaranty signed by two responsible persons, that, in case the bid is accepted, he will at once execute the contract for the same, with good and sufficient sureties, in a sum equal to the amount of the contract, to deliver the article proposed, in conformity with the terms of this advertisement; and in case the said bidder should fail to enter into the contract, they to make good the difference between the offer of said bidder and the next responsible bidder, or the person to whom the contract may be awarded.

The responsibility of the guarantors must be shown by the official certificate of the Clerk of the nearest District Court, or of the United States District Attorney.

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We, the undersigned, residents of ————, in the county of ————, and State of ————, hereby jointly and severally covenant with the United States and guarantee, in case the foregoing bid of ———— be accepted, that he or they will at once execute the contract for the same, with good and sufficient sureties, in a sum equal to the amount of the contract, to furnish the articles proposed in conformity with the terms of this advertisement, dated July 8, 1864, under which the bid was made; and, in case the said ———— shall fail to enter into a contract as aforesaid, we guarantee to make good the difference between the offer of the said ———— and the next lowest responsible bidder, or the person to whom the contract may be awarded.

Witness: { Given under our hands and seals this —— day of ——, 180—.

[Seal.]
[Seal.]

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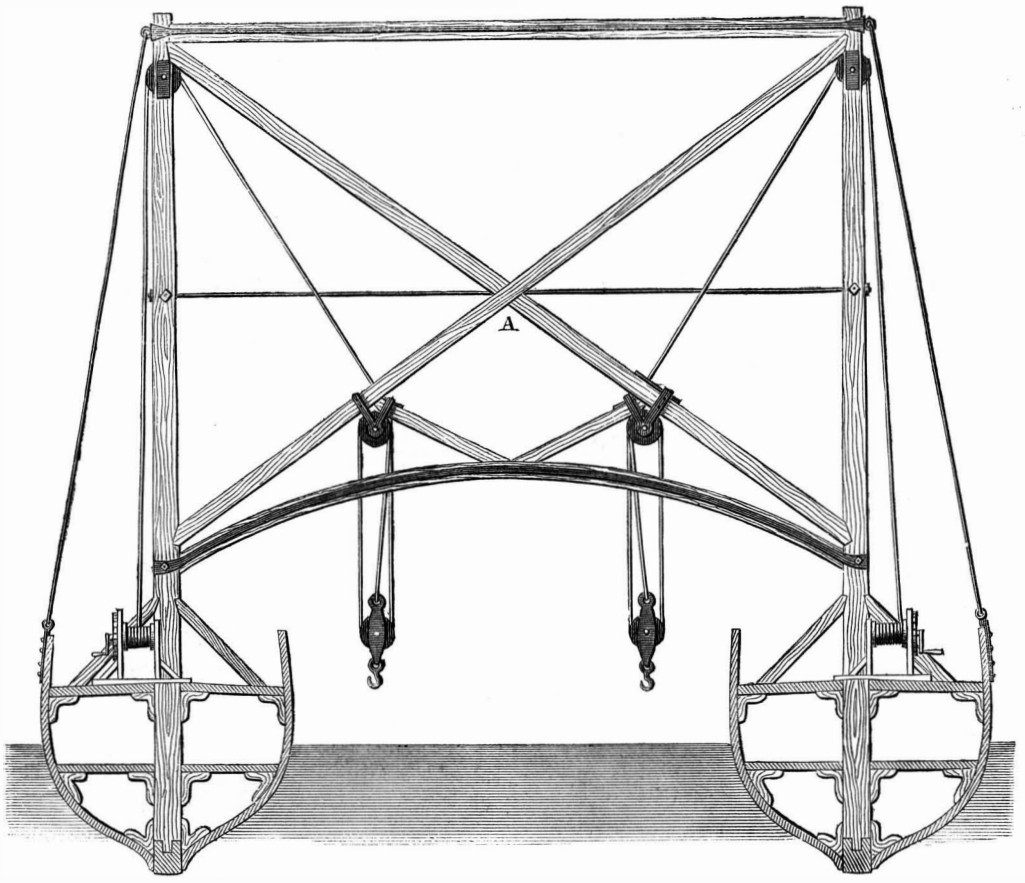
Improved Floating Derrick.

A convenient and powerful apparatus for raising sunken ships, anchors lost overboard, or prosecuting similar duties is most useful, and in harbors or large cities they are in great request for lifting cargo that has fallen overboard or for conveying water-logged boats sunk in slips to some out-of-the-way place. A derrick which can be used for these purposes is here illustrated, and a glance at the engraving is sufficient to give the reader a clear idea of its objects and the uses to which it may be put.



COLLINS'S FLOATING DERRICK.

The derrick consists of two strong hulls or boats connected by a rigid frame, A. These frames are braced and trussed in all directions, and so strengthened, both fore and aft the boats, and "athwart ships," as shown in the engraving, that they will sustain a great load with safety. The hoisting arrangement may be any combination of blocks or pulleys which is suitable for the work in hand. The very large space on the frames amidships, between the hulls, permits the use of any kind of tackle, so that heavy weights, such as ordnance, anchors, or steam boilers can be raised, swung clear of the water, and carried to a place of safety, or deposited on one of the boats. Steam or horse power may be applied to this derrick, and by the introduction of engines and boilers to one of the hulls it may be independent in its movements, and not only propel the boat but furnish power for hoisting.

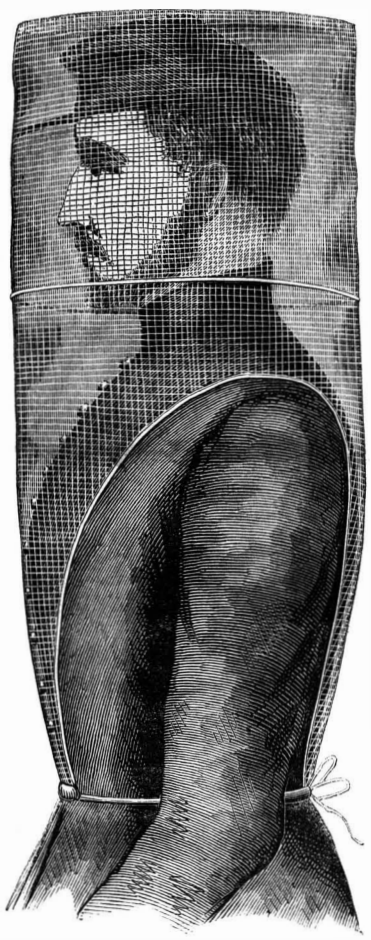
The frames are so made that they can be taken down and stowed on board either one of the boats for transportation to a distance. This is a most useful invention, and one that can be employed to great advantage under a great variety of circumstances; it was patented on May 3, 1864, through the Scientific American Patent Agency, by James V. Collins, of Georgetown, D. C.; for further information address the inventor at that place.

Thonger's Patent "Caution" Label.

The object of this label, which is intended to be employed only with poisonous medicines and those used for outward application, is to prevent accidental poisoning by the caution which its peculiar nature involuntarily suggests when the bottle is taken into the hand. The patent consists in the application of a broad bordering of rough glass paper around the label. The effect of this on coming in contact with the hand is so well marked that it is impossible to conceive that it should be taken up without being noticed. This effect is as surely produced during the darkest night as in the daylight; and, as was quaintly remarked to us by a distinguished pharmaceutist, the label almost suggests that a lucifer should be struck on its roughened susface to enable the nature of the contents of the bottle to be seen. It appears to us to be the most practically useful poison label that we have seen. It is manufactured in the various sizes required both for dispensing and retail bottles.—*Chemist and Druggist, London,*

PORTABLE MUSQUITO NET.

Most persons during their life-time have had occasion to use some protection from the annoyance of insects, and have "made-shift," so to speak, by employing veils, newspapers, etc., for their protection. The simple arrangement shown in the accompanying engraving is a perfect safeguard against the annoyance alluded to; and travelers, tourists, sportsmen, and in fact all classes, will find it a great convenience. One half the pleasure of trouting is often taken away by the assaults of the little gnats or black flies with which the woods abound, and the angler has as much as he can do to protect himself without making war on the fish.



Soldiers in the field will also be greatly comforted by the use of this net, and may enjoy a refreshing slumber in spite of musquitoes, "gallinippers," and pests of that class. Who has not been robbed of a noon-day's nap by flies walking over his face? This contrivance remedies all such evils. The engraving explains the invention; the weight is only two ounces, and the net folds up so compact as to be easily carried in the pocket.

This invention was patented by John Zengeler, of Chicago, Ill., through the Scientific American Patent Agency, on Dec. 2, 1863. For further information address him as above, Box 2,682.

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